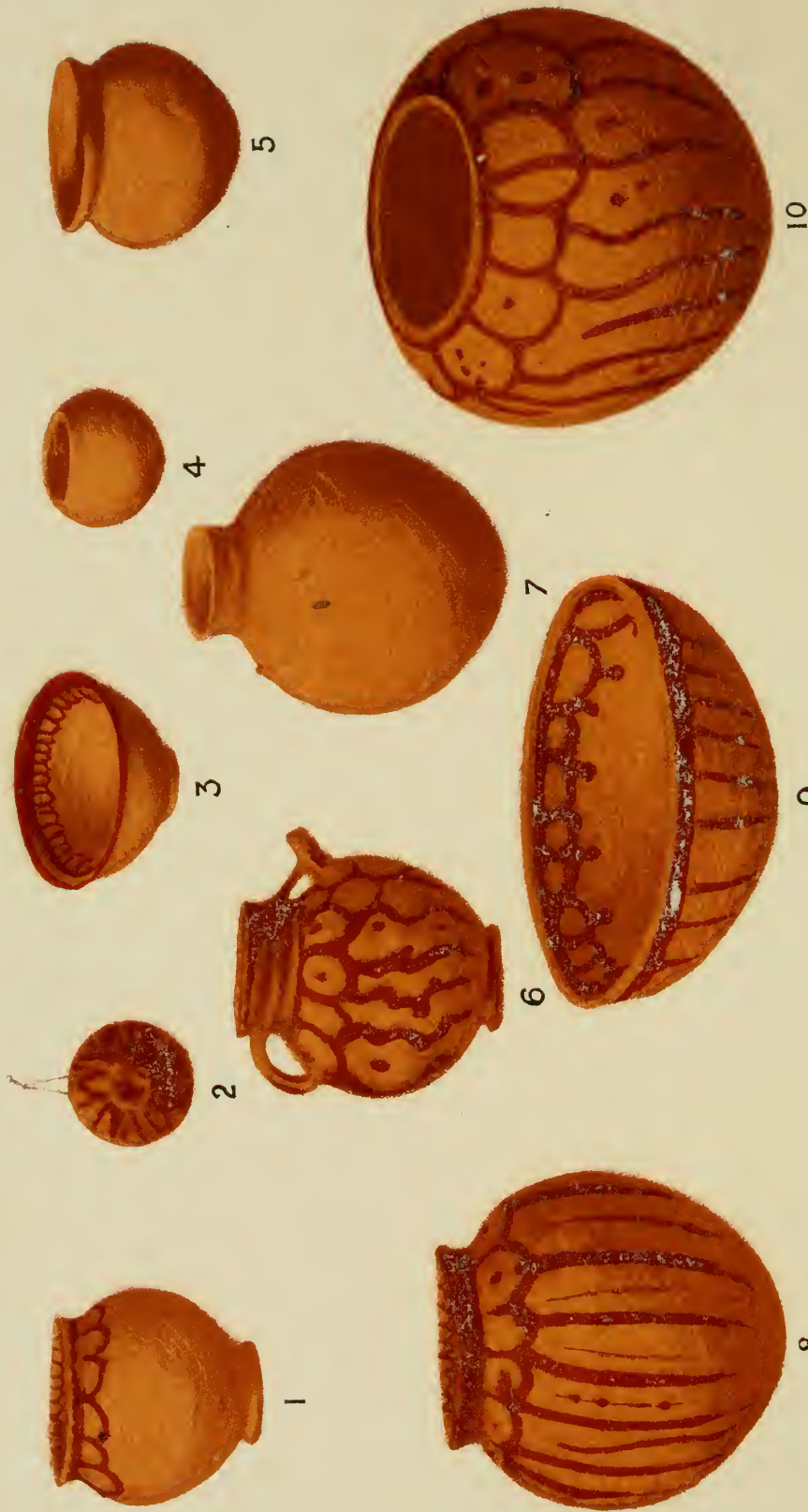




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The Natural History
OF
Sokotra and Abd=el=Kuri.



THE NATURAL HISTORY OF SOKOTRA AND ABD=EL=KURI

Being the Report upon the Results of the Conjoint
Expedition to these Islands in 1898-9, by Mr. W. R.
OGILVIE-GRANT, of the British Museum, and Dr.
H. O. FORBES, of the Liverpool Museums, together
with information from other available sources

FORMING
A Monograph of the Islands

EDITED BY
HENRY O. FORBES, LL.D.

DIRECTOR OF THE LIVERPOOL MUSEUMS; AUTHOR OF "A NATURALIST'S
WANDERINGS IN THE EASTERN ARCHIPELAGO," ETC.



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PREFACE.

This volume contains the results of a conjoint Expedition undertaken in the winter of 1898-9 by representatives of the British and Liverpool Museums, for (chiefly) the Zoological exploration of Sokotra. By incorporating the results of previous or (where available) contemporaneous explorations, the work forms practically a Monograph of the islands visited.

The cost of the Expedition was borne by votes from the Government Grant of the Royal Society of London and the Museums Committee of the Liverpool City Council, supplemented by subsidies from the Councils of the Royal Geographical Society of London (in addition to a loan of instruments) and the British Association for the Advancement of Science.*

This volume is issued, in accordance with a mutual agreement under the authority, and at the expense, of the above named Committee of the Corporation of Liverpool, as a special *Bulletin of the Liverpool Museums*, its official publication.

The Committee desires to thank very heartily the various distinguished specialists who have contributed sections on the different groups on which they are authorities, to whom the Editor would beg to add his acknowledgements of their forbearance over the delay in the publication of the work, which he deeply regrets, but which is due to circumstances quite beyond his control.

The grateful thanks of the two Institutions interested in the Expedition are due to the GOVERNMENT OF INDIA for so generously granting the service of the despatch boat *Elphinstone*, of the Indian Marine at Aden, for the conveyance of its members to and from their destination; for the loan of tents and for the protection, while on the islands, of a military guard consisting of a native sub-officer and a Sikh, as also for the use of camels in their excursions in Arabia: to General O'MOORE CREAGH, V.C., Political Resident at Aden, for the fullest official aid, and, together with Mrs. Creagh, for much private kindness: to Captain JACOB, First Political Assistant, from whom they received constant and valuable advice and ready assistance, besides his own and Mrs. JACOB'S hospitality in their delightfully-situated residence, on their return from Sokotra: to Captain MACARTHUR and the officers of the *Elphinstone*, who did everything possible for their comfort and assistance while on board: and, finally, but not less sincerely, to D. MACKINNON, Esq., and the British India S.S. Company, for generous concessions and privileges in the matter

* The British Association Committee consisted of Dr. J. Scott-Keltie; Dr. H. O. Forbes; Dr. W. T. Blanford, F.R.S.; and Professor Weldon, F.R.S.

of fares and baggage on the voyages to and from Aden, on their ships *Manora* and *Ghoorkha*.

I am under special obligations to my friends Johnston Watson, Esq., M.A., and S. W. Lambert, Esq., of the Middle Temple, for their kindness in obtaining for the Expedition from the Eastern Telegraph Company the use, free of charge, of the cable from Aden. This privilege was most highly appreciated by Mr. Grant and myself, as, in possessing it, not only was telegraphic communication with Bombay and London (necessitated during the period of anxious delay referred to in the *Narrative*) expedited, and at a great saving to the resources of the Expedition, but also our families were able to be informed frequently of our welfare.

The *Narrative of the Journey*, by the Editor, as originally written, dealt at considerable length with observations made on the history, anthropology and ethnology of the Sokotran Archipelago, besides treating of subjects the interest and importance of which only became apparent on investigation after the return of the Expedition, such as, among others, the origin of the domestic cattle found on Sokotra; the marriage customs of the ancient Sokotri; and the question of the distribution of land and water in the Indian Ocean as indicated by a study of the fauna and flora of the islands. It was found, however, that the incorporation of this material would have brought the cost of publication beyond the sum provided therefor, and would have besides rendered the size of the volume inconveniently large, so that this section has had to be reduced to little more than a mere itinerary. These subjects, together with, it is hoped, the results of the topographical observations, will form a separate publication.

HENRY O. FORBES,

Director of Museums.

THE MUSEUMS, LIVERPOOL, *April*, 1903.

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Illustrators: P. Smit, H. Gronvold, F. O. Pickard-Cambridge, J. Green,
H. Knight, Mrs. I. B. Balfour, M. Horman-Fisher, T. Latham,
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ERRATA.

On page 50, for **Gubbat Shoab**, read **Ghubbet Shoab**.

- „ 62, for **Ægialitis**, read **Ægialitis**.
- „ 212, for **Potamon Socotrensis**, read **Potamon socotrensis**.
- „ 241, after **Harpactopus**, insert *Smith*.
- „ 278, under upper figure, insert title **Adelostoma bicarinatum**.
- „ 289, after **Melyris**, insert *Fabr*.
- „ 329, for **Chærocampa**, read **Chærocampa**.
- „ 333, after **Eremocossus**, insert *Hamps*.
- „ 375, after **Anthrax**, insert *Scop*.
- „ 385, transfer **Aspilocoryphus** to line below **Lygæidæ**, auctt.
- „ 406, for **Trithernis arteriosa**, read **Trithemis arteriosa**.
- „ 415, on lines 16, 15, 11, 10 from bottom of page, for **Periplanata**, read **Periplaneta**.
- „ 430, for **The Centipedes of Sokotra**, read **The Centipedes and Millepedes of Sokotra**.
- „ 441, under **Hirudinea**, read **Chætopoda** in same type as *Hirudiæna*.
- „ 472, after **Momordica**, insert *Linn*.
- „ 505, after **Securinega**, insert *Juss*.
- „ 506, after **Ricinus**, insert *Linn*.
- „ 507, after **Angræcum**, insert *Borg*.
- „ 531, after **Heterochloa**, insert *Desv*.



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Sketch Map of SOKOTRA showing Route.

Narrative

of the

Journey.

By HENRY O. FORBES, LL.D.

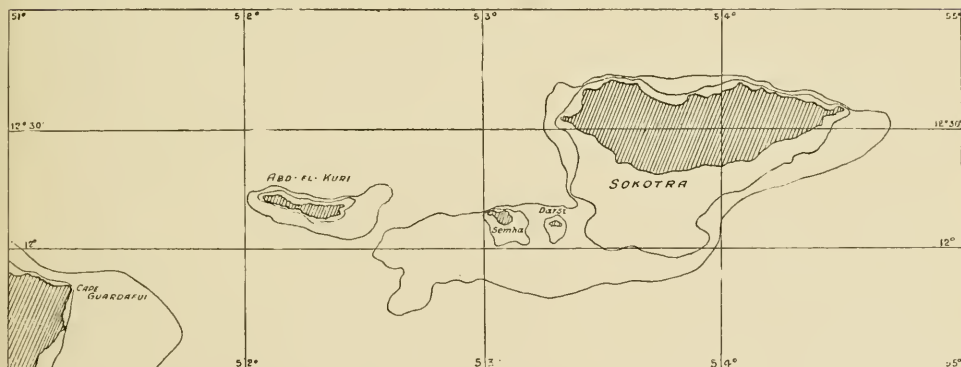
PLATES I., 1A.

Narrative of the Journey.

I.

Aden. Sheikh Othman. Lahej.

Sokotra is the largest and most easterly island of a small archipelago lying some 120 miles from the coast of Africa, nearly opposite its great Eastern Horn which terminates in the Cape of Guardafui, under the 12th parallel of N. latitude. Its other members are The Brothers—frequently called The Sisters by the older navigators—(two minute islets, Semha and Darzi), slightly to the southward, and Abd-el-Kuri, the second in size and the nearest to the continent. The Brothers as well as Abd-el-Kuri are surrounded by banks covered only by 10 to 30 fathoms of water. The former bank is united to that on which Sokotra stands: but from Abd-el-Kuri it is separated by a valley of 100 fathoms, while Abd-el-Kuri is cut off from the extensive projecting shelf of Guardafui by a narrow but deep trough of several hundred fathoms in depth. The



SKETCH MAP SHOWING POSITION OF SOKOTRAN ARCHIPELAGO WITH REFERENCE TO AFRICA.

summits, of the larger, at all events, of these islands are now known to be among the land surfaces of the globe that have longest, if not always, held their heads above the sea, their sculptured peaks and pinnacles attesting to the waste and wear they have so long endured. They have been mute witnesses probably since earliest Paleozoic times to the drowning of many

lands around them, and to the uplifting from the ocean of mighty ranges on the two continents towards which they now look, and of which at one time or another in their wonderful vicissitudes they have formed a part.

Few islands are better known by name to eastern travellers than Sokotra. It was a very usual course for ships, in the days of the early Indian voyages, to make the island after rounding the Cape before "laying" before the monsoon for the coasts of Malabar, and now every funnel that comes through the Straits of Bab-el-Mandeb, wherever bound, sights its cloud-belted rocks. Nevertheless, it has been little visited by Europeans, by reason of the great difficulty of reaching it, for, on account of its harbourless shores, it is not a port-of-call except for vessels specially chartered, or for native baghlahs never savoury or very safe.

Unless for surveying purposes, no scientific investigator had visited the island, and none had devoted any attention, save for a few desultory observations, to the biological problems that this insular group presents, till the year 1879-80, when, as the result of the efforts of a committee of the British Association, the exploration of Sokotra was entrusted to Professor I. B. Balfour, of Edinburgh, then in the Chair of Botany in Glasgow University, a naturalist already distinguished for similar investigations as a member of the Royal Society's Transit of Venus Expedition to the Mascarene Islands in 1874-5. Accompanied by Lieut. Cockburn, Mr. Leech and Mr. Scott, Prof. Balfour devoted two months' hard labour to his task, and returned with large collections of very exceptional interest.

The following year (1881) two Germans, Dr. Schweinfurth and Dr. Riebeck (accompanied by Drs. Mantay and Rosset), both well known as accomplished scientific men, quite unaware of Professor Balfour's Expedition, had, while in Arabia, their attention directed towards this isolated speck of land, and together made their way to Sokotra in a native baghlah, and further contributed to our knowledge of the island by their exploration, which lasted some six weeks.

After an interval of seventeen years Sokotra was again re-visited by the late Mr. Theodore Bent, an erudite traveller, well known for his archaeological investigations in many countries. He was accompanied by Mrs. Bent and Mr. E. N. Bennett, of Hertford College, Oxford.

The first two expeditions—Professor Balfour's and Dr. Schweinfurth's—were, from the eminence of their leaders in that science, specially botanical; while of Mr. Bent's the main object was the search for traces of the Hymyaritic civilisation of Arabia. Although Dr. Balfour and the members of Dr. Schweinfurth's Expedition interested themselves also in the people and their language, and made collections in several groups of zoology, as did Mr. Bennett of Mr. Bent's party, as well as a few of the naval and military officers who at various times had been officially engaged in the Arabian seas, no expedition had visited the islands with the special object of investigating their fauna. Considering that the Report of the British Association Committee of 1880 concluded with the statement that "the Committee feel no doubt that in every branch of science considerable results are yet to be obtained by further

investigations in Sokotra," it was thought by us that the region might with profit be more thoroughly investigated zoologically. It was accordingly arranged that the exploration should be undertaken during the winter of 1898-99 by Mr. Grant and myself.

Having purchased tents and camping equipment and laid in the necessary stores, barter, and medicines, we sailed from the Thames for Aden on the morning of the 28th October, 1898, on board the British India Company's s.s. *Manora*, under the able commandship of Captain Henderson, so well known in the service for his kindness, consideration and geniality.

Among our fellow passengers we had not only the pleasure but were fortunate in making the acquaintance of Captain Jacob, who was on his way back to Aden to assume the duties of First Political Assistant. He was returning from furlough, after having fulfilled a period of arduous service in Somaliland. This Protectorate, however, had a month before been transferred from the charge of the Indian Government to the Foreign Office, and over it Col. Hayes Sadler, then First Political Assistant at Aden, who had been making the preliminary arrangements for our Expedition, had just been appointed Consul-General, and to whom Captain Jacob was then succeeding. Mrs. Jacob, we were interested to find, was a daughter of the late Major Hunter, formerly Assistant Political Resident at Aden, whose name had become well known to us, while consulting the literature on Sokotra, as one who had visited and written several valuable reports on the island, and had also been a member of the Sokotra Committee appointed by the British Association for the exploration which was carried out by Professor Balfour. To both of them we were later greatly indebted for much assistance and hospitality in Aden, which we reached shortly after noon on the 17th November.

Going ashore in the Residency boat, in which Captain Jacob kindly invited us to take a place, we passed the despatch boat *Elphinstone*, of the Indian Marine, which was waiting to convey us to Sokotra, and, lying higher up the harbour, there was pointed out to us the steam yacht *Gottfried*, having on board an Expedition, for the investigation of the Himyaritic inscriptions of Southern Arabia, sent by the Imperial Academy of Sciences of Vienna, of which Hofrath Professor David Müller, the distinguished Arabic scholar and authority, was a member. Landing at the Prince of Wales Quay, we fixed our quarters in the Hotel de l'Europe, where in the evening Captain Lloyd-Jones, of the Army Medical Service, called upon us to very courteously offer any assistance he could, and to inform us that the honorary membership of the Club had been extended to us. From him, however, we learned, in the course of conversation, the rather disquieting news that difficulties of a political character—of which he was not fully acquainted—had arisen between the Government of India and the Sultan of Sokotra which might possibly interfere with the Expedition's proceeding to its destination. It was with some anxiety, therefore, that we drove to the Residency next morning to report our arrival to General Creagh, by whom we were received in the kindest possible manner. He expressed the fullest sympathy with the objects of our Expedition, but regretted he had to convey to us the disappointing informa-

tion that the relations between the Indian Government and the Arabian Sultan of Gishin, who is also Sultan of Sokotra, were at the moment considerably strained, owing to His Highness having entirely ignored the various letters of complaint addressed to him by the Government of India in regard to numerous acts of piracy which he had been permitting in Sokotra since the wreck of the P. and O. steamer *Aden* on its eastern point. The General, therefore, greatly to his regret, was unable to give us recommendatory letters to the Sultan, or rather Governor, of the island—who, though only Viceroy on his uncle of Gishin's behalf, also generally receives the style and title of Sultan. Without these letters our reception on the island might be unfriendly, and such obstacles to moving about placed in our way as to make our visit of little profit; while if we were the bearers of an official recommendation disregarded by the Sultan, the Government of India would be placed in an unpleasant position. This situation had been communicated by General Creagh to the India Office before our departure from London, with a recommendation that we should be advised to postpone our Expedition for a season. He was, therefore, much surprised when he heard that we had actually arrived in Aden. Strangely enough, although we were in communication with the India Office, and had a few days before we sailed received a telegram through it from the Government of India granting us the loan of tents from the Service stores at Aden for use on the Expedition, no hint of this communication had been conveyed to us. Now that we had arrived, the Resident, sympathising with our disappointment, most considerably volunteered to re-examine the question at once, in the hope of being able to suggest some arrangement to the Indian Government under which the Expedition might, with as little delay as possible, be allowed to proceed. As some few days would necessarily have to elapse before a reply could be received, he very amiably placed at our disposal for the interval, should we care to go there, his bungalow at Sheikh Othman, on the northern shore of the bay forming the harbour of Aden, where it was cooler, and where at least some little vegetation and more animal life was to be found than in the Settlement—an offer we cordially accepted.

Matters connected with the landing and arrangement of our baggage detained us for two days, during which we had the pleasure of exchanging visits with the members of the Austrian Expedition to South-Arabia on the *Gottfried*. Count Lamberg, Plenipotentiary of the Imperial Academy of Sciences, we were unfortunate enough to miss on our reciprocal visits; but our intercourse then with Dr. David A. Müller, Dr. Kossmat, Professor Simony, Dr. Paulay and Mr. Bury is a pleasant recollection, while our relations at a later date, as will appear below, placed us under deep obligation for kindness of no ordinary kind during a period of grave sickness.

On the 20th, we were at last able to take advantage of the Resident's permission to occupy his bungalow at Sheikh Othman, some ten miles to the north. In the cool of a delightful morning we set out in a couple of gharries, accompanied by our taxidermist Cutmore and a Somali butler Jamah. We reached Sheikh Othman before eight o'clock, and found there a very comfort-

able, airy, europeanised oriental bungalow of stone, standing in a large walled-in shady compound, abundantly planted with palms, acacias, almond trees, jasmine, hibiscus, and other flowering shrubs.

Here we spent a couple of most pleasant days—all we dared arrange for, as we were in hourly expectation of news from the Government of India in regard to our journey to Sokotra—and obtained a glimpse of the fauna of the desert. Life was practically confined to the walled-in, well watered gardens surrounding the various bungalows there, and consisted chiefly of insects, lizards, and birds. Considering the encompassing desert, the number of species we obtained was remarkable.

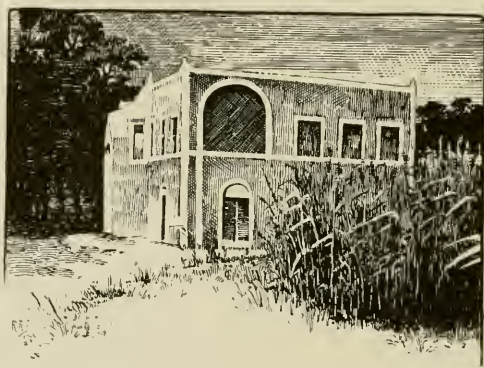
We were greatly disappointed to learn on our return to Aden on the 23rd that no reply had arrived from the Government of India to General Creagh's telegram. It was indeed possible, we now learned, that some considerable time might elapse before a reply could be received. Considering, therefore, that the season and our leave were rapidly and fruitlessly passing away, and that the probability was great that, if permission were given to proceed to Sokotra, it would have to be preceded by preliminary political negotiations with the Sultan at Gishin, which would still further consume our time, we decided, if no reply should reach Aden within the next few days, to abandon altogether our Sokotra journey, and proceed into the little known mountainous Abdali country of South Arabia under the Sultan of Lahej, between whom and the English Government the most friendly relations have now for a long time existed.

The Resident, who, in an interview he had with the Sultan the day after our return, had taken the opportunity to warmly commend our Expedition to his assistance and protection, should we proceed into the interior, had received from His Highness a cordial invitation for us to visit him at Lahej, with the assurance of a safe escort and the promise that everything in his power would be done for the comfort and success of our mission among the hills.

Several days having passed without news from India, we agreed that by accepting the Sultan's invitation to Lahej we might employ our time to more advantage there than in Aden. For our stay in the interior General Creagh was good enough to place at our service from the Bombay troop at Khor Muksor, an Arab jemadar (or sub-officer) and a Sikh sowar as guard, and for our transport, the necessary riding and baggage camels. We decided to travel as lightly equipped as possible, arranging for the bulk of our baggage and the requisite servants to be sent on to us, if no authority for our visit to Sokotra should arrive by the date we had given ourselves as the latest we could afford to wait. After that date we agreed, as our best course, to undertake an investigation of the little known hills in the north of the Sultan's dominions. In addition to our excellent butler Jamah, a reliable interpreter was all we needed to complete our retinue, and him we found in Gulaid Elmi, a Somali. This man's linguistic attainments were really remarkable. Arabic and Somali were his mother tongues. He spoke Hindustani excellently, French by no means badly, and English with

wonderful accuracy and with a good accent. Moreover, he could write each of these languages in its own script. His countenance being open and pleasing, we engaged him on trial as interpreter for our Lahej excursion. I may say here that he proved most satisfactory in every way. I learned from him subsequently that, as a boy, he had come under the notice of, and been sent to a good school in Aden by that humanitarian and talented officer Major Hunter. He had served as clerk in various English business houses, and had been employed later as a secret service agent of the Government in, among other places, the French possessions on the Red Sea.

Accompanied, therefore, by our two Somali servants, we left Aden late in the afternoon of the 25th November to pass the night at Sheikh Othman, whence the following morning, the 26th, on being joined by our troopers and camels, we set out across the Tehamah. In the afternoon we reached Lahej, and put up at the Sultan's guest-house. Next morning to our dismay we discovered that small-pox was very prevalent in the town, and had carried off one of the Sultan's daughters the previous day. Considering the disastrous plight we should be in if any of us should be smitten with the disease, which might well happen exposed as we were to constant contact with servants from the palace, and the guards and comers and goers generally, we decided to move without delay away towards the mountains. The necessary arrangements had hardly been completed, however, when



SULTAN'S GUEST HOUSE AT LAHEJ.

a courier arrived from Aden bringing a letter from Captain Jacob, with the welcome intelligence that the Resident had been authorised to arrange for our visit to Sokotra, and that the *Elphinstone* was under orders to sail as soon as we returned. The 27th was spent in making arrangements for the journey back, and on the evening of the 28th we were in our old quarters in Aden.

The following morning on calling at the Residency, General Creagh gave us the gratifying news that by the arrangements he had made we should be able without further delay to proceed to Sokotra, where also he expected we should find no difficulties placed in our way. Staying with the General we found Lord Lovat and Mr. Weld-Blundell who had just arrived thus far

on their exploratory journey to Abyssinia and Khartoum, which they carried through with such great success.

The following two days were fully occupied in our final preparations for embarkation. In the selection and engagement of servants Gulaid Elmi, our interpreter, in whom we now conjoined the responsibilities of headman, proved himself specially efficient, business-like and trustworthy. In addition to those already employed by us, we added a cook, an assistant cook and two gun carriers. In the discussion of terms neither the amount of the monthly wage nor the *arbut* or present advance seemed to any of them half as important a consideration as the promise of a liberal *bukshish* to be settled at the end of the engagement if their service proved satisfactory. In addition to these, by General Creagh's kind permission, the jemadar, Saleh Abdullah, who had attended us to Lahej, and a Sikh sowar of his troop, accompanied us as personal guard. Our party, therefore, numbered eleven, for eight of whom there had to be provided special rations uncontaminated by swine's lard or *Halal*-ed flesh, uncursed in the letting of its blood. In this matter Gulaid, who (having himself few sanctified prejudices) was reckoned by these men a true believer, in possessing no bigotry as to the Kaffirism of his masters, could be trusted to satisfy both sides. So handing him the requisite sovereigns, I despatched him to the bazaar to provender the camp. He returned a few hours later with the detailed reckoning of the furniture of a kitchen—pots, kettles, and saucepans—and three months' supplies, among which ghi, chutney, onions, *keshre* or coffee bean husks and dates figured largely, besides *mussuks*, or goat-skin water bottles, blankets, beads, Manchester cottons and trinkets for barter. The whole assortment was packed, paid for, and delivered by him at the wharf before midday with perfect accuracy, and at half the price we should have had to give at any of the large Parsee stores on Steamer Point.

By the Resident we were furnished with an official letter to the Sultan of Sokotra, explaining the object of our visit and intimating what would be expected of him towards the Expedition. Mohammed Jaffier, the adviser in native affairs, in whose office the official Arabic transcript of the Resident's native letters is registered, was also good enough to hand me, as the result of personal amenities between us, a private letter to the Sultan, an old and intimate friend of his, which would secure for us favour and assistance even if strained relations should continue with the Government. He was obliging enough also to offer to select for me *bukshish* for the Sultan—that "unearned increment" which every Arab, high and low, looks for and loves more than gain—such as he knew would be appreciated by one passing so isolated a life as the Sokotran Governor, consisting of a vial of otto of roses—the pure, unadulterated (so rare to obtain) Persian oil—and various richly-patterned turbans in cloth of gold, for himself, with a large garish *ormolu* English-made circular mirror having a trio of carved candleholders projecting from it, intended for his harem.

Finally, to complete our arrangements came our banker, Cowasjee, with the all-important treasury of the correct medium of exchange on Sokotra, as

we were assured, in the shape of about half a hundredweight of Maria Theresa dollars, the true *Abu nokut*, or "Father of dots," shewing the orthodox seven stars on Her Majesty's tiara—all very sticky and highly odorous, tied up in a rough gunny bag for purse.

About five o'clock on the afternoon of the 30th November we embarked on board the *Elphinstone*, whose genial commander, Captain Macarthur, at once put to sea.

II.

Abd-el-Kuri.

On clearing the harbour, a course was laid for Abd-el-Kuri, the westernmost member of the Sokotran archipelago, where we had the Resident's permission, if we should find the island interesting enough, to detain the *Elphinstone* for a week before proceeding to Sokotra.

At daylight of the 3rd December we descried this little visited island breaking our eastern horizon as a low bar of land with two double-peaked heights in the centre. As we approached from the west, steering for an anchorage on the southern and at that season the lee shore, the island resolved itself into a lower western and a higher eastern end. Coasting along we eagerly scanned its surface for some indication of its promise to a naturalist; but its general aspect from the sea was quite disappointing, for it appeared to be composed of absolutely bare rock, devoid even of a vestige of vegetation and, notwithstanding the curious legends of the old navigators and historians about its people, to be entirely uninhabited.

The *Elphinstone* slowly felt her way to an anchorage in a little bay with a sandy beach about the middle of the south coast—the Bandar Saleh of the charts—at the only place where a break in the rocks occurs.

At first not a native showed himself, and not a sign of habitation was visible from our deck. By the time, however, that we had finally come to anchor, at nine o'clock, a small group of spectators had gathered on the shore anxiously watching our operations. On landing we found them a rather timid, poor, and ill-nourished company. They spoke both Arabic and Sokotri, and we learned through our interpreter that they had no objections to offer to our going anywhere on the island we pleased: but no one seemed to have greater authority than another, and they referred to no superior. The men were tall, rich coppery brown in colour, while the children were considerably darker: but there was no admixture of negro blood among those we encountered, such as Duarte Barbosa makes mention of among those he saw on the island.



NATIVES OF ABD EL-KURI.

A rise of a few feet from the water's edge over a drifted sand-barrier facing the shore, brought us to the level of a plateau or wide strath which stretched right across the island

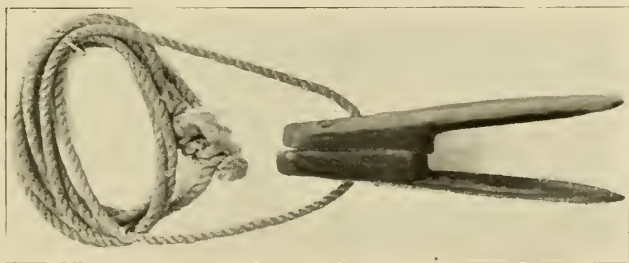
NATIVE OF
ABD-EL-KURI.

from sea to sea, and separated the higher limestone-capped range on the east from the lower black archæan hills on the west. This strath, which had a low water parting running athwart it, was floored with the detritus from the hills on both flanks. About a mile to the north-west, we could descry under and behind the shelter of the low hills which concealed it from the sea, a single small house-cluster, about which a few women and children were moving.

Our collecting party, augmented to eleven by a party of officers from the *Elphinstone*, separated and skirmished over several miles of dry wady and rocky ridge. Although only the merest sheen of green was visible from our anchorage, the dry, hard foreshore was found to our surprise carpeted over (especially where the ground showed signs of being more or less inundated during the wet season) with, besides a sparse covering of low shrubs, numerous lowly and, in many instances, mere threadlike herbs, rising little above the surface of the soil, but producing disproportionately conspicuous flowers. Except for a single well, however, we saw no water anywhere.

Birds were disappointingly few, but of the species we obtained, two proved to be new to science, a sparrow (*Passer hemileucus*, Plate vii. fig. 1) and a wagtail (*Motacilla forwoodi*, Plate vii. fig. 2). Two species of lizard of the genus *Hemidactylus* were also found to be new. Land shells were abundant under stones and upon the bushes, and of these four are unknown elsewhere. Insect life was scantily represented, very few butterflies—only three all told,—beetles, or bees being observed; but of the two latter groups all the species turned out to be undescribed, while one of the beetles forms the type of a new genus. Over many of the shrubs a handsome spider (*Argyope clarkii*, Plate xiv., fig. 3) had stretched its web of such strong threads that with a steady pull one could snap off the stoutish branches to which they were attached without breaking the silk. Scorpions abounded under every stone, and two representatives of a new endemic genus (*Heteroncho*) were collected.

In the afternoon several of the inhabitants came off in the launch, bringing lizards, fishes, turtle-shell, and muscovite to exchange for rice, "Indian



NOSE PINCERS USED BY ABD-EL-KURI DIVERS.

tobacco," and lead for sinkers for their seines. I observed that they did some line fishing also, for I saw a solitary individual angling astride a poor



VIEW OF THE 'STRATH' AND NATIVE DWELLINGS, ABD-EL-KURI.

catamaran of three narrow logs of wood lashed together, with his legs dangling in the water, by which to paddle himself about the bay. It seems that the chief employment of the people is as divers for pearl-shell on the Bacchus Bank to the north-east of the island, on the boats of shellers who come probably from Zanzibar, Arabia, or India. The diver descends to the sea floor holding to a line weighted by a heavy stone on which he stands, his nostrils being closed by a small wooden spring-clamp or pincers. At the end of his 'turn' he drops the stone and is pulled to the surface.

Next day we explored to the left of the anchorage, paying a visit to the only native hamlet, so far as we could learn, on the island. The dwellings were extremely poor. All were more or less circular in shape—the simplest form and the easiest to construct—three to four yards in diameter, and composed of unhewn blocks of coral and rough conglomerate stone piled one upon the other. A longer stone for lintel carried the superstructure over the single small squared orifice which served for door, which, with the interstices in the wall, took the place also of chimney and windows. The roof was flat and composed of brushwood, over which was laid a layer of clay, or occasionally a covering of mats or skins. The approach to the door was protected by a double *cheval de frise* of thorny brushwood four to five yards in length. The doorway of most of the huts faced south-east toward the hills, which would protect them from the driving rains of the west monsoon. The door itself was a mere wicker-work hurdle. Some of the dwellings contained several women and children, of whom, while the older ladies were indifferent to the prying eyes of the Feringhee, the younger hastily and with some alarm drawing a garment over the lower part of the face, retreated into the obscurity of their abode as I peeped within the door. Round every hut lay numbers of large turtle carapaces (each with an oblong hole in the middle of its back, for what purpose cut I do not know), from which the 'shell' had been stripped. Near many of the huts also lay baskets full of dark coloured muscovite, in large crystals, but for what use it was collected I could not discover.

The dress of these people, who can hardly number more than two or three score souls all told, consisted, among the men, of the ordinary turban round the head from the forehead to the nape of the neck; a loose cotton jacket buttoned down the front, and a cotton cloth, girt about the loins, hanging down to the ankles from a supporting belt; over the shoulder they carried an extra cotton cloth, whose fashionable pattern was red and white check. Of the women we got only a glimpse, but their principal garment was the long *thobe*, worn slightly open at the throat, reaching down to the ankles. Some of the men wore sandals, but the majority went about barefooted.

Scattered over the stony strath and everywhere all around the base, and on the lower slopes of the archæan hills in the interior up to about 60 or 70 feet, I observed much marine detritus, consisting of pieces of sponge, coral fragments and fields of dead mollusca—the most conspicuous and abundant being a large species of limpet with perforated apex (*Fissurella*)—as if an enormous wave had swept over the lower part of the island at no distant period and left this jetsam behind. A reef-limestone of Pleistocene

age, containing *Goniatites retiformis*, is deposited in nearly horizontal strata up to about 40 feet above sea-level upon the archæan rocks west of the anchorage.



NATIVE DWELLINGS, ABD-EL-KURI.

On the 5th December, soon after sunrise, we started for a long day on Gebel Saleh, the highest peak on the island. Proceeding northward along the strath over sand and shingle for about two miles, we found a convenient spur on the north-west face leading more or less directly to the summit. From this aspect, which is entirely hidden from the anchorage, the mountain appeared quite clothed with dark green vegetation. Partly on the spur and partly in a neighbouring nullah we scrambled upward with much effort, seeking out our way over the roughest of ground. Huge blocks, themselves little hills in size, with perpendicular escarpments 50 to 60 feet in height dislodged from the limestone strata above, constantly barred our way and necessitated lengthened detours to circumvent them. Between the elevations of 500 and 600 feet, the vegetation, which below that had been

composed of numerous low bushes not exceeding two to three feet, became more abundant, in some places even dense, with trees seven to eight feet high. Among them, up from about 300 feet to nearly the summit, I gathered a small and very elegant asclepiad, a species of *Cochlanthus* (*C. socotranus*), and noted the remarkable *Euphorbia* described as *E. Abdelkuri* by Professor Balfour on page 529, and figured on the page opposite. The strong yellow webs of the large beautifully marked spider referred to above (*Argyope clarkii*) were met with all up the mountain side, very aggravatingly moored across the open passages between the trees. Several other inconspicuous arachnids were also collected, of which a full account by Mr. Pocock is to be found in a subsequent section. Under nearly every stone, and often several inches deep in the soil beneath them, in the crevices of the rocks and on the twigs of the shrubs we found numerous land-shells, assignable in all to nine species belonging to the genera *Bulinus*, *Tropidophora* and *Littidion*. On the summit the rock crannies were tenanted by crowds of a specially charming though minute form *Littidion gratum*, its coral-red interior conspicuous against the white limestone. Of these nine species four have proved new to science. Three or four species of scorpion, one centipede and the gigantic *Scolopendra balfouri*, Plate xxvi. (which was found first in Sokotra, by Balfour), together with a few beetles, indicate the chief invertebrates taken by us on Gebel Saleh. Within a few feet of the summit I found two rare ferns: Schweinfurth's *Asplenium*, and in faultless condition Balfour's beautiful Maiden-hair (*Adiantum Balfourii*). A diminutive linear-leaved purple Iris (*Romulea elulis*), a dwarf *Asphodel* (*Asphodelus tenuifolius*), and a slender ground-orchid (*Habenaria socotrana*), together with a long spiked *Orobanche* (*O. abyssinica*) hidden away in a deep recess under a cliff, flourished well on the scanty soil. The limestone is first seen resting on the granitoid and gneissic rocks at an elevation of about 700 to 800 feet. The uppermost limestone strata seemed to me to repose on a lower unconformable series, inclined to them at a considerable angle, as seen in the accompanying view of Gebel Saleh (p. xxx.) photographed from the shore.

On the shore near our landing place I picked up several nodules of a water-worn, amber-like gum or resin, which certainly was not an obvious product of the island, for no gum-producing trees, save euphorbias, were anywhere seen by us. These fragments were most probably, therefore, washed out of the soil or sea-borne to Abd-el-Kuri. I had expected them to prove to be a copal, drifted, perhaps, from the Copal Coast, but from an analysis which has been made, it seems to be neither true copal nor true amber but to possess some of the characters of both. Its true origin and habitat must for the present remain an open question. The "amber of good quality," which Duarte Barbosa mentions as found in this island, refers with little doubt to the *amber gris*, or "grey amber" obtained from the Spermi-whale.

The natives complained that they suffered greatly from fever, induration of the liver, and, especially their children, from dysentery, and begged for medicine. I administered quinine and ipecacuanha to several of those who

were suffering most, but some of the children seemed hopelessly ill. The duration of our visit was too short to enable me to treat these poor people with much hope of benefit. Dysentery among the children is probably due to bad and scanty food. The islanders must subsist almost exclusively on fish, molluscs, and turtle—on the latter so abundantly that they may truly be called *chelonophagi*. The extreme aridity of the island has been remarked upon, and where the mosquitos which showed themselves in our cabins on board at night—with, however, little inconvenience to us—were bred, is difficult to imagine.

Nowhere during our excursions did we see the slightest vestige of cultiva-



VIEW OF SOUTHERN FACE OF GEBEL SALEH, ABD-EL-KURI.

tion of any sort. With the exception of a few goats there were no domestic animals, nor any indications of the presence of any other mammal on the island. The statement, therefore, of D'Albuquerque, who visited the island in 1507, that there were, in his day, large flocks and herds, is very remarkable, considering the vegetation that the soil now produces.

At 5:30 on the morning of the 6th December, the *Elphinstone* weighed anchor, and stood away for Sokotra. Proceeding eastward for some hours close under the shore as far as the south-east cape, her course was laid north-east by east for Kallansiya. In several places as we passed along, I could plainly observe patches of limestone abutting with a sharply defined line of demarcation against the low granitoid hills facing the sea and at a

lower elevation than anywhere else on the island, indicating very distinct lines of fault. These patches looked as if they had been morticed into gaps in the granitoid rocks, and lay inclined at an angle of 35° to 40° to the horizon. Neither on our passage along the south-western part of the coast, nor on our excursions on shore, or our view of the island from the top of Gebel Saleh did we note a single deposit of limestone upon the archæan rocks to the westward of the depression running athwart the island.

III.

Sokotra: Hadibu.

In the afternoon of the 7th December, the *Elphinstone*, passing under Ras Shoab, the westernmost point of Sokotra, into the bay of the same name, cast anchor at the mooring spot indicated on the Admiralty chart. Here our captain thought it might be possible to land the Expedition in this less surf-beaten bay more safely than at the town of Kallansiya, a little to the north, where at that season the sea rolls in with great violence on the beach, rendering a landing difficult and liable to accidents. The spot looked forbidding and desolate, and without sign of habitation. As chance would have it, however, we found a baghlah at anchor, from which some information could we hoped be obtained as to the locality. On landing, which had to be accomplished by wading from the launch through a breast-high surf, we found a venerable Arab—the naghoda of the boat, which, it turned out, belonged to the Sultan, and had just arrived from Bombay—sitting on the beach, who assured us that if we landed there it would be extremely difficult to obtain food or portorage, and impossible to get camels to the spot. On this information we deemed it unwise to risk landing there, although so near to a region of the island we specially desired to visit. Captain MacArthur, therefore, decided to run as far east, in the morning, as Ras Haulaf, a projecting headland near to Hadibu, the capital of the island, under which we might expect to find a sheltered anchorage and landing place.

It was only much later that we knew how great a risk we had run in landing in Ghubbet Shoab to make inquiries from the Sultan's baghlah. She was lying in voluntary quarantine with a large number of her crew down with small-pox! Indeed, I believed I had from our deck seen them carrying off one of their dead; but the naghoda stoutly denied they had any sickness when I asked if they had not just been burying one of their number!

Leaving Ghubbet Shoab at 2 a.m. of the 7th, we steamed slowly along the northern coast of the island with a brilliant moon overhead. In passing through Tamarida Bay we had a splendid view, against the clear sky of the opening day, of the towering pyramids and needles of the Haghier range, which here enclose a wide and deep amphitheatre in which lie embowered among palms the white houses of Hadibu. Ras Haulaf promontory under which we anchored forms the eastern arm of this Bay. Facing us a few yards from the shore stood a fair-sized square white-washed edifice, with close by what looked like a mosque and other low buildings,

while a short distance further off lay a cluster of miserable huts. Soon after we had anchored, a half-white half-red pennon appeared over the square white edifice, which we learned later was the residence of the Governor ; but it had not fluttered long before it was hurriedly replaced by a Union Jack. Presently a canoe came off with two men, who informed us that they were of the household of the Sultan, who had that morning left for a residence he had several hours distant in the interior. To one of these men we entrusted a letter to be despatched at once informing His Highness of our arrival, and the object of our visit, and that we had brought for him letters from the Government in Aden which we desired to present as soon as he could honour us with an interview.



VIEW OF HADIBU AND THE HAGHER MOUNTAINS FROM TAMARIDA BAY.

Late the same evening our messenger returned on board to inform us that the Sultan, who had arranged to return over night, would receive us next morning. Accordingly after breakfast the following day, Captain MacArthur and I with Gulaid our interpreter, proceeded on shore, where an aged sheikh was waiting to conduct us, between the ranks of a barbaric guard of honour, to the Sultan's audience chamber in a low unfloored shed a little distance from his "palace." Sultan Selim received us at first very coldly and suspiciously ; but when he had perused General Creagh's communication, and the letter from Mohammed Jaffier, and heard we had come on a scientific mission only and not on a retributory visit, he mellowed considerably, and through our interpreter returned his thanks for the letter we had brought from the Resident of Aden. He accorded us permission to visit any part of the island we desired. Our present he accepted with little effusion, and by a gesture con-signed it to one of his relations near him, as if the receiving of "bukshish" was too common an occurrence to necessitate his even touching or looking at it. Mrs. Theodore Bent had advised us to obtain as guides two Sokotri, Amr and Ali, who had accompanied her husband and herself and been very useful to them during their visit to Sokotra. On making a request for their services from the Sultan, both men, strange to say, were standing close by me among

the throng that had followed us into the reception room, and were forthwith told off to attend us and see to our requirements at a charge to us of one and a quarter rupees per day. If these men had proved faithful and helpful to the Bents, they had been much spoiled by them, or had vastly deteriorated in character since their visit. They had bled these travellers very freely, we gathered, and we soon found out for ourselves that unless we were prepared to pay the Bent tariff, we should meet with opposition everywhere. Both men were entirely subservient to the Sultan—Ali, indeed, was his slave, and half of Amr's and all Ali's pay would go into His Highness's pocket. A very short term of probation served to show them in their true characters, and had we not put our foot down and dismissed them after about a fortnight's employment, we should have experienced more trouble and greater delays than we did. Their successors, chosen by ourselves, turned out more faithful, honest and helpful.

After the conclusion of our interview, no time was lost in making arrangements with Amr for the transportation by baghlah of our baggage and servants from the *Elphinstone* to the mouth of the Hanefu, distant a few miles west, close to the town of Hadibu near which we proposed to camp. By evening everything was transhipped and transported. This was excellent 'business,' and for Orientals expedition itself. Had we landed at Ghubbet Shoab or Kallansiya it would have taken at least a fortnight to have communicated and secured an interview with the Sultan, without which we could not have begun operations.

On the morning of the 9th we took leave of the *Elphinstone*, and landing at Haulaf proceeded on foot along the shore towards Hadibu or Tamarida as it is also named. When we reached the Hanefu estuary, where the landing of our baggage through the surf was proceeding rapidly and safely, we turned due south and lit upon a pleasant spot for our camp about a mile inland, close by a palm grove at a pretty bend of the river where the bank looked down from a slight elevation upon the wimpling water. Before sunset we were established under canvas and fairly comfortable. The crowds of insects attracted to the lights of our tents demanding to be captured, made a good beginning to our Sokotra collections.

The Plain of Hadibu, two to three miles deep and four to five wide, in which we stayed from the 7th to the 18th of the month, forms, from a geological point of view, one of the very interesting features of the island. It has the semblance of a vast quarry with an open front to the sea, walled in elsewhere by apparently insurmountable pinnacled and extremely picturesque cliffs, 2000 to 3000 feet in height, worked out of the solid granite core of the island. Except for a gateway along the sea margin round the shoulder of its east and west arms, the amphitheatre looked entirely land-locked. Investigation, however, showed that the three nearly equidistant streams which crossed the Plain were fed from as many ravines, deep cut in the central granite mass. The undulating floor of this vast excavation was, with the exception of a few sandy swarded patches, entirely overspread with shingle and large boulders, some of which were hundreds of tons in weight, bespeaking vast transportation power and an enormous amount of denudation, whose manner

of action in forming the amphitheatre, however, seems (to me at least) not at all easy to explain.

The roughness of the ground was concealed in the general view by a thick low covering of scrub, consisting chiefly of *Dirichletia*, *Euphorbia*, *Jatropha*, and conspicuous among the others from their bizzare habit, *Adenium* and the remarkable indigenous Cucumber-tree, *Dendrosicyos*.

In the town of Hadibu the houses were of the square flat-roofed form so common in Arabia (such as one sees at Ma'ala, near Aden), set in narrow winding streets overshadowed by Date palms. From the sea, or at some distance off on the plain, these whitewashed dwellings glinting from amid the palm fronds presented a beauty and picturesqueness which were sadly discounted by the dirt and odours revealed by a stroll through its streets. On the plain the hamlets showed a very different style of architecture. There the huts were circular in form. The walls, from 10-12 feet in diameter, were built in the cyclopean manner of unhewn cubes of stone piled up in rough unbonded courses to a height of seven or eight feet, the chinks between the stones serving for windows and chimney. The roof was formed of palm branches laid upon rafters stretching from rim to rim plastered over with clay and often green with grass. In the larger huts the rafters were further supported on pillarlike piles of stone or on Date stems rising from the floor. The doorway, a low square orifice, was closed by a rough hurdle of palm leaf mid-ribs. A few skins, a very primitive loom, a quern for milling grain, an assortment of earthenware pots and a few skin bottles for holding ghi, comprised the furniture of the best appointed of these dwellings.

The people are entirely pastoral, possessing large flocks of sheep, goats, and cattle. The latter belong to a very small, shorthorned, deep dewlapped, unhumped breed, differing entirely from the cattle of Arabia, India, and Africa, the lands nearest to Sokotra. The people cultivate occasionally a few patches of millet (*Sorghum vulgare*), tobacco and cotton. The one-humped camel is their beast of burden, a surer-footed and stronger breed than the Arabian.

Ghi, a clarified butter made from the milk of cattle and goats, is the chief export of Sokotra. In former days the island was celebrated as a market of Aloes and Dragon's-blood—indeed, the name Sokotra is believed to be merely a corruption of Sukkatira, *suk*, the Arabic for "market," and *katir*, "Dragon's-blood"; but only a small quantity of either is now prepared or exported.

In Hadibu and the hamlets of the plain, pottery was extensively manufactured, but in a very primitive fashion notwithstanding the long intercourse which has existed between Sokotra and countries producing high-class earthenware. It was entirely hand-made, the potter's wheel being quite unknown. The women were the fabricators, and their clay was collected from pockets in the limestone rocks, where a bright red deposit is left by the rains, and from the bases of the central cliffs and in some of the streams, where a greyish yellow, more unctuous sort resulting from the waste of the granite, accumulates in considerable quantities. The two kinds were

levigated together, with the addition of finely powdered limestone nodules. Out of a single lump of this paste small pots and dishes were modelled by the fingers and a smooth stone; larger vessels were built up from a base, ring by ring, to their desired size and shape, smoothed and fashioned inside and out by the thumbs, the palm of the hand and a smooth pebble constantly dipped in water. A small curved disk of cocoanut shell—an import into the island, whose flora does not contain this palm, singularly enough—or the half of a bivalve shell, served to scrape the vessel to a uniform thickness. After being exposed in the air till dry, the pots were baked in the open in the centre of a fire of wood faggots. When thoroughly fired their ware is of a bright red colour, with black patches here and there where incompletely exposed to the action of the heat through contact with the ashes. Many of the smaller pots, which they constantly used to hold milk, were entirely of a dark manganese colour, as if during their firing the air had been excluded from contact with the entire surface. The art of glazing was apparently unknown. Ornamentation was generally omitted; where it existed, however, it was never scored or impressed, but invariably streaked upon the vessels from a motive which I have been unable to reconstruct. The pigment employed was mainly Dragon's-blood resin, but whether compounded with other ingredients and how applied I had no opportunity of observing. The manufacture of pottery was evidently not confined to particular families; each household, so far as I could learn, made its own. I did not observe a trade mark upon any of the pieces I examined, and none of it was apparently made for export. Plate i., forming the frontispiece, shows the forms most generally fabricated. Figures 1 (designated *Sahan*), 4 and 5 were used for containing milk, ghi, or aloe juice, 4 and 5 especially for cooking or for heating milk in; figures 6, 7, 8 and 10 represent water vessels: 6 being specially employed to contain water for religious ablution—of which only a few drops appeared to be necessary at a time, 7 (designated *Sarlaha*), 8 and 10 served as water receptacles for domestic purposes, and 3 and 9 as food holders. Figure 2 (named *Makorseich*) was hung on the walls for ornamental purposes—like plates on our drawing-room walls—when not in use for burning incense on. As most of the dwellings had earth floors, few of these utensils were provided with bases, it being necessary for their upright position only to press them into the ground.

Having arranged as the general plan of our movements to visit on leaving the plain the higher regions of the Haghier mountains, then the eastern plateau, and finally the little-known south-western valley of the island, we decided to break up our Hadibu camp on the 18th. It looked, however, for a time as if the region of the Haghier we were to visit was hardly to be left to our selection, for Amr, Ali and the camel men had determined to have a say in the matter. It was impossible to name a place out of the plains to which the paths were not, according to them, dangerous or impassable for loaded camels; and whither camels, the only means of transport on the island, could not be taken it would be useless for us to go, as without our supplies and our apparatus we could accomplish little or nothing. Long and weary were the discussions

conducted with them through our interpreter, and endless the maps traced on the ground by us and them to show the possible routes, before it became evident that Mrs. Bent's recommendees were simply deceiving us. As soon as this became apparent, we made our own selection of our next camping station and the route to it, and issued orders for the necessary camels to be brought in. These arrived on the 17th to the number of 22, and on the 18th, after the lengthy and rather trying experience, to which we were new, of arranging associated requirements on evenly-balanced packages for accommodation on the same camel, we started towards mid-day for Dahamis on the eastern slopes of the Haghier mountains. Crossing the plain eastward we ascended by the short, narrow gorge of the Lahas river to the Addah Pass separating the amphitheatre of Hadibu from the Plain of Kam, where we bivouacked for the night, and on turning in were soothed to sleep by the 'song of the setting sun,' from an owl of a species at that date, but we hoped not for long to be, unknown to the fauna of Sokotra—*Scops socotranus*.

IV.

Dahamis. Kamahanu. Jena-agahan.

On the morning of the 19th December our kafilā got away early in charge of Gulaid, our headman, while Grant and I, accompanied by Cutmore, followed behind on foot collecting as we went. Wending our way southward through the Plain of Kam we emerged by a narrow gateway into the northern end of the more extensive Garieh Plain, when we veered west to enter the contracted defile by which the Nehashir, a tributary of the Motaha, drains into that plain seaward the waters of the great Dahamis Glen. In a nook just within the gateway we found, on our arrival in the late afternoon, our tents already pitched by Gulaid on a grassy plateau, 750 feet above the sea. During this march the first indications of malarial infection presented themselves in our taxidermist, in fatigue, headache and prostration, which developed within twenty-four hours into a malignant attack of æstivo-autumnal fever. He was followed on the sick list in rapid succession, within the next three days, by both of us and by a number of our Aden servants. The fact of these men being attacked would tend to show that we possibly escaped infection in Arabia, and were probably first inoculated in Sokotra, notwithstanding that the period of incubation was shorter than the 18 to 22 days which has generally been my own experience. In Abd-el-Kuri mosquitos were not malignant, nor were they numerous, for the islet contained absolutely no water except, so far as we could discover, in a single brackish well 15 to 20 feet deep. Still, malaria did exist there, as the inhabitants told me, and I saw some cases of it. Mosquitos were abundant at Hadibu, and there, no doubt, the disease was mainly contracted. Under the belief then, however, that the locality, the character of the drinking water, or miasmata were the causes of fever, we decided to get without delay away from Dahamis to some more open spot over which the wind could freely play: for though the night temperature was 66° F., during the day the heat, direct and

reflected from the hills around us, was generally over 100° F. To Gulaid, accordingly, the only fever-free member of our company, we were compelled, on the 23rd, to entrust the search for a new camping site, which he was instructed to select as high as attainable with camels, and open to the breeze from the sea. On his return he reported having found such a spot as we desired on a height named Kamahanu, less than a day's journey distant.

No opportunities in the intervals of fever were lost of collecting in and investigating the Dahamis Glen which ascended in front of us westward to a Pass some 2000 feet high, while the peaks of its northern and southern arms overshadowed us by another thousand. While there was little or no difference in the fauna from that met with in the plains, we encountered here for the first time many of those peculiar plants which characterise the flora of the Haghier Alps.

On Christmas Day we struck our camp at Dahamis, and set out for our new and, we trusted, more healthy quarters. We presented a sorry spectacle, for we were all either actually suffering from fever, or weak and dispirited from an attack recently passed. On emerging on the Garieh Plain, Kamahanu was pointed out to us as a hill, isolated in the centre of the plain, rising only some 600 or 700 feet above its level. On the slope of this hill had been chosen our camping ground, to our disappointment quite away from the high range, though open to the sea breeze.

When the last of our followers with the baggage arrived at Kamahanu it was quite dark, and as most of our party had become incapacitated by fever during the march, the baggage had to lie as it was dropped from the camels' backs. Next morning things were even worse, as all but three out of our company of eleven were on the sick list, and within twenty-four hours these three also. In my own case the paroxysms were less severe and prolonged than in the case of the others, so that I was able to administer the necessary medicines, and, with the aid of Jamah, our butler, who, ill though he was, bravely kept the kitchen going, to have prepared such food as they could take.

From the camp I could clearly make out with a glass a village situated high up on one of the north-eastern buttresses of the granite *massif* of the Haghier, and above it a flat grassy plateau, which, as there was clearly a path to the village, ought to be easily reached from it by camels. To this spot we determined to move as soon as the health of the camp permitted. This was not till the morning of the 30th, when, after a great effort in loading the tents and baggage upon the camels, we were able to set out for Jena-agahan, or Thlutid, as our destination was variously designated. The ascent was very laborious, but the site when attained proved an excellent choice. The altitude was nearly 1600 feet, the air delightfully fresh, and the view of mountain, plain and sea commanded from it charming and exhilarating. Milk and fresh meat were abundant, and the health of our party, except in the taxidermist's case, rapidly improved. The severity and intractability of the fever in his case, complicated as it was with hæmoglobinuria, caused us great anxiety, so much so that we had decided on the 13th, if there were no amelioration next day, to break up the Expedition, hire a haghlah from the

Sultan and return to Aden. By great good fortune, a few hours later a messenger sent by the Sultan arrived from Kallansiya—70 miles distant—with a letter from Dr. Müller informing us of his arrival there on the *Gottfried*, along with the members of the Austrian Expedition, and of his having brought a mail for us. As there was a medical officer in their party, we dispatched our Arab jemadar the same afternoon on camel-back with a history of Cutmore's case, and a request for advice under the circumstances.

Many interesting additions were made to our collections during the the seventeen days we camped at Jena-agahan—minerals, plants, insects, reptiles, and mammals. Among the latter were examples of the wild Ass (Plate ii.), which was among the most important of our zoological acquisitions. These herds which roam the Garieh Plain are, in my belief, the survivors of Nubian ancestors brought from the Red Sea coast by, probably, the ancient Egyptian incense collectors. When closely examined they are seen to differ in colour and in many other points from the common donkey, with some few individuals of which I had an opportunity of comparing them side by side in Hadibu. The Sokotran Ass differs entirely also from the Somaliland species, which wants the shoulder and dorsal stripes.

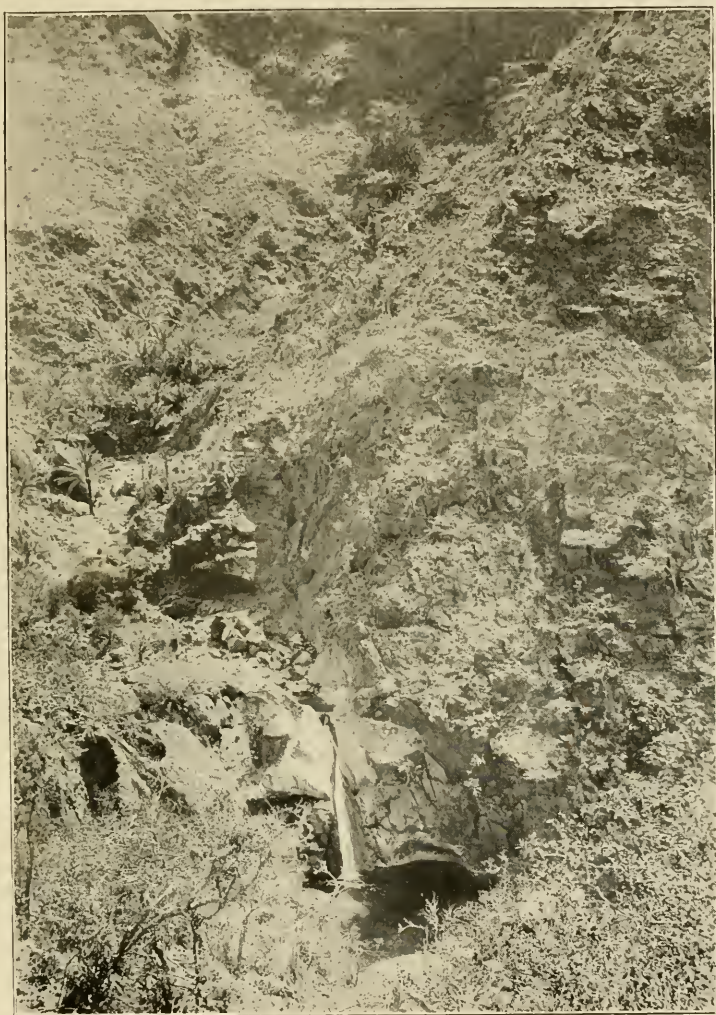
Numerous house-clumps dotted the neighbouring spurs of the mountains, inhabited by sheep and cattle-herds whose chief occupation was milking the cows and goats for the preparation of ghi. This was collected from them by traders from Zanzibar in Africa and Makulla in Arabia, who gave rice, calicoes, African slaves (in large transactions), amber or Maria Theresa dollars and two-anna pieces of the Indian mint in exchange. These coins were, however, looked on everywhere (except perhaps in Hadibu and by the Sultan, who was the chief trader of the island), more as barter than true currency. They would pass from the recipients directly to the silver workers in Hadibu or Kallansiya, to be made into ornaments for themselves or their womankind. Among themselves coins were rarely used. In their commercial transactions, the barter was cattle, ghi, hides, dates, pottery, or cakes. Pottery was not an article of export, but appeared to be an instrument of currency in the island, two pots having the value, as I learned after much questioning, of one cake—probably a luxury not always obtainable—baked of Jowari meal, pure or mixed with dates, of which 25 were equivalent to one Maria Theresa dollar. Thus 500 pots, 250 cakes, 10 sheep, 5 goats, 1 cow, 15 fraselas (about 48 lbs.) of Dragon's-blood resin, and 10 Maria Theresa dollars would all be of about equal value.

V.

Homhil.

The taxidermist's fever having at last given way to aconite, arsenic and quinine, we were able to arrange to leave our pleasant tented field at Jena-agahan on the 16th for Homhil on the plateau overlooking the eastern side of the Garieh Plain. With a caravan of over a score of camels the rate of march could be no faster than the speed of the slowest of them, so that we

had to bivouac for a night on the way in the bed of the nearly dry Dimichiro river, which skirts the eastern side of the plain, whence on the 17th we continued our journey south-eastward. Throughout these two days, which were of exceptional clearness, the beauty of the view presented by the Haghier slopes and summits, it would be difficult to exaggerate. From no other part of the island can the majestic outlines of the crests, crags and



VIEW IN GOAHAL GORGE, SOKOTRA.

aigulles of this most picturesquely sculptured granite core of the island be so well seen as from the Garieh Plain. Our route to the plateau ascended steeply for 1500 feet up the gorge of the Goahal, which flowed strong and noisily, like a Scotch burn, over its shingly bed, meandering from its upper and precipitous reaches down through palm-dotted gulches and over several

charming waterfalls. The Homhil Plain we found to be another of those remarkable geologic features of the island, similar to but somewhat smaller than the Hadibu amphitheatre—a vast excavation denuded out of what was once an unbroken plateau of limestone a thousand feet higher than its present floor, and 2000 to 3000 feet above the level of the Garieh Plain.

On the 20th, the jemadar returned from Kallansiya bringing our first mail since November, and kind letters from Professor Müller (who was now in charge of the Vienna Expedition), and from Dr. Stefan Paulay, with medicines and advice as to the treatment of our sick, luckily by that time less needed. Our Austrian friends sent not advice only, but a



DRAGON'S-BLOOD TREE.

largesse of two camel loads of 'medical comforts,' consisting of a large supply of aerated mineral water, a few bottles of wine, some fresh bread which was a great luxury, and a quantity of biscuits our supply of which was running low. Of all these the mineral water proved the chief boon in acting as an alterative probably. Certain it is that after a short use of it the improvement in our general health was very marked and continued. How deep our gratitude for this most generous and thoughtful kindness was and is can only be appreciated by those who have had to camp for lengthened periods far

from the "resources of civilisation," and are responsible for the health and lives of others.

The geological structure of Jena-agahan and the surrounding region was entirely granite. The Homhil Plain, on the other hand, was surrounded by limestone escarpments, and although the altitudes of our camp at both places varied little, the vegetation was markedly in contrast. At the former station that curious and ancient tree, one of the chief botanical characteristics of the island, the Dragon's-blood (*Dracena*) could be seen only on the highest tops far above us, while at the latter it surrounded our camp as a predominant feature of the flora, along with Frankincense trees and with *Adenium*, *Dendrosicyos*, and *Dorstenia*, an interesting triad whose swollen stems suggested their being affected with elephantiasis.

We stayed here till the 27th of January, and had a very successful and delightful sojourn, adding largely both of the flora and fauna to our collections, as well as to our topographical and geological observations. Here also we came more in contact with the people than at any former station, and I was successful in obtaining some interesting notes on their customs, manners, games and industries. It was



CUCUMBER TREE (*Dendrosicyos*).



FRANKINCENSE AND ADENIUM TREES.

impossible, however, owing to the religious scruples of the Sokotri, to induce them to submit to be photographed, or to have their physical dimensions taken. Nevertheless I obtained surreptitiously a few likenesses. These notes, however, extending as they do to a considerable length, must be reserved for some other place, the space at my disposal here being limited. I may merely mention the fact that these observations, taken along with the traditions recorded by ancient writers on Sokotra, seem to point to a very remote antiquity for the advent of the Sokotri to their present home.

The climate on the Homhil Plain was delightful. The temperature during the day rarely exceeded 78° to 79° F.—on one occasion only reaching 90°—while during the night from 62° to 65° F. was the usual reading of the thermometer.

From Homhil it was our intention to reach Adho Dimellus, situated amid the highest peaks of the Haghier, by one or other of the two deep central valleys that open on the Nugget Plain, which stretches along the southern coast, and thereafter, if possible, proceed to the south-western district. No persuasion, however, could induce our camel men to take the southern route. They resolutely refused to retreat from the declaration they had made that camels could not ascend from that side, but only from the Hadibu Plain. Without more certain knowledge of the country than we possessed we were compelled to adopt the latter route: and it was only when we reached our desired destination that we discovered how deliberately they had misled us. The path was probably somewhat more difficult, but the number of loaded camels that came up these very valleys and passed our camp on their way to Khadoop proved that had we insisted on our orders being carried out, we should have encountered no insurmountable difficulties. Unfortunately we had no time to risk in proving by actual traverse that our surmise was right and the camel men were wrong.

VI.

Elhe. Adho=Dimellus. Hadibu. Bandar Saleh (Abd=el=Kuri).

On the 27th of January we broke camp at Homhil, unwillingly retracing our steps down the Goahal gorge and north-westwards across the Garieh Plain, till reaching the Wady Jubher, in which we bivouacked for the night, not far from our former camp, of unhappy memory, at Kamahanu. Next morning we continued our journey, and crossing the Addah Pass reached Hadibu Plain, where, turning southwards, we pitched our tents late in the afternoon at Elhé, a hamlet not far from where the Dinchan—the deep glen by which we purposed to ascend to the heart of the Haghier—flows out through its iron gates into the plain on its way to the sea. Here we spent two days preparing for the journey before us by selecting fresh camels in place of those that seemed unfit, and reducing and re-arranging the loads for distribution among an increased number of animals. We had also our collections to pack in boxes and Wardian cases for storage in Hadibu, and to replenish our stock of preservatives, ammunition and food-supplies from the stores left in that town in December. Collecting was not neglected in the intervals of this work. Mr. Grant secured some excellent specimens of the endemic Grosbeak and other birds, and made many additions to his stock of the new *Charaxes velox* (Plate xviii.), as well as capturing numerous Hymenoptera, Neuroptera and other insects.

It may be mentioned as an example of the permanency of the effect of the sun's rays upon the skin that, having on the 30th January omitted to put

on one of my gaiters, a few inches of the naked skin of that leg was left exposed below the edge of my knickerbocker and severely burned. The exposure lasted less than two hours, but so scorched was the part that I was quite crippled for several days. The skin in the ordinary course gradually turned brown, and although it was continuously afterwards covered by a

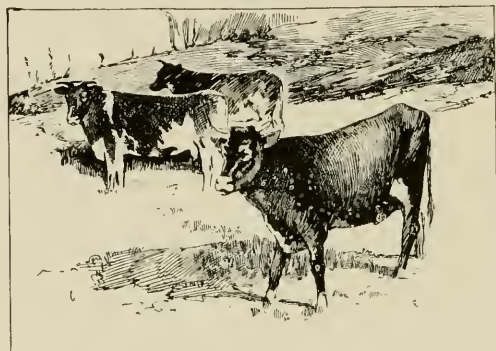


OUR CAMP AT ADHO-DIMELLUS.

bandage, and later by my ordinary dress, the browned belt on my leg was conspicuous in the middle of 1902, and was still traceable in January, 1903, three years after the occurrence.

On the 31st of January, we resumed our march to Adho Dimellus, taking our way up the Dinčau Valley. As the ascent is very steep, and the path in many places narrowed to a few feet, great care was required

in directing the camels, and consequently progress was slow. The climb, however, displayed the splendid character of the Sokotran dromedary, its sure-footedness, the wisdom with which it picks its steps in dangerous places, its docility and its endurance. In mid-afternoon we bivouacked on a recessed corner in the glen, some 2000 feet above the sea. Next morning continuing our ascent, we reached Adho Dimellus Pass, the highest plateau on the island, and the water parting between the two coasts, at an altitude of 3000 feet. From this point we obtained a magnificent view, on the one hand, to the north, down the steep valley up which we had climbed and out to the sea horizon beyond; on the other hand, southwards, over wilder and even more picturesque glens to the gate-like clefts which their rivers have cut through the limestone cliffs that barred their way to the sandy Nugget Plain and the sea. Out of this plateau rises a forest of majestic peaks, of which Gebel Dryat, the loftiest summit in Sokotra, rears its twin spires nearly 5000 feet into the clouds. Descending a little way on the southern side of this Pass, we pitched our camp under the shadow of two lofty pillars



SOKOTRAN CATTLE.

of granite, in a corner in the midst of a wilderness of boulders half buried amid a shrubbery of St. John's-Wort (*Hypericum mysoreense* and *H. scopulorum*), and hedged round by an impenetrable thicket of the remarkable *Corculus Balfourii*—a site which for picturesqueness could with difficulty be equalled.

Here we remained till the 17th of February, for we had decided to abandon our visit to the south-western valley, as after spending a week or ten days at Adho Dimellus it was evident it would have taken all the available time we had before the 20th (when the *Elphinstone* was due to return for us), even to reach that district. This elevated camp, at all events, stood in the midst of the peculiar flora of the island, and in a locality where we found much to add to our zoological collections as well. The roof of Sokotra, as we may call this district, was formed of a series of bay-like meadows, cut off from each other by buttresses of the peaks. They were clad with a luxuriant ankle-deep sward of succulent herbage on which grazed flocks of sheep and goats and large herds of the extremely beautiful dwarf cattle of which I have already spoken. It is one of our chief regrets that we brought back

with us no specimen of their skins or skeletons for home examination. It never struck me till our return that they were not an introduction by the Portuguese, since they were so European in form, and differed altogether from the races found in India, Arabia or Africa, the countries nearest to Sokotra. That cattle occupied the island for many centuries prior to the advent of that nation, I have discovered evidence since my return which I have not the space here to discuss. Nor can I enter into a description of the remarkable remains that cover the ground on the more westerly of these water-parting plateaux.

The climate at this altitude was simply superb, and if a good path were constructed from the Hadibu Plain—an engineering undertaking of absolutely no difficulty—a delightful sanatorium for our Aden troops might with very little cost be erected a short day's march only distant from the coast, where fresh meat (beef, mutton, and kid) and milk could be abundantly obtained, while fruit and vegetables of every sort could be grown, and fish procured with the greatest ease.

On the 13th we had the great pleasure of welcoming in our camp and entertaining for a night Dr. Müller and the members of the Austrian Expedition, whose yacht, the *Gottfried*, had come round to Haulaf. We had thus the opportunity of personally expressing to them our thanks for their kindness to us in our sickness. Dr. Kossmat and Professor Simony had hoped to make the ascent of Gebel Dryat, but the extremely wet weather that came on—almost the only truly heavy rains we experienced while on the island—and lasted incessantly for three days, frustrated their plans for that occasion.

On the 18th we packed up our camp and belongings and set out for Hadibu to await the return of the *Elphinstone*. We arrived the same evening, and pitched our tents a little nearer the shore than the site of our first encampment. We could not but be struck with the difference of the plain in the interval. Every sign of grass had disappeared, and a brown stony desert lay before us. The few cattle and sheep which had not been drafted to the uplands wandered disconsolately and thin over it searching for food, and finding it almost entirely on the leaves and twigs of the shrubs. The next two days were occupied in packing up our collections and baggage for embarkation, and in paying off our camel drivers and bukshish-ing those who had assisted us.

On the morning of the 21st the *Elphinstone* anchored off the town. The transfer of our belongings on board began at once, and was completed in the afternoon. After paying a farewell visit to the Sultan, who was then residing in Hadibu, to thank him for the unfettered way we had been permitted to rove about the island, for the use of his camels (for which we had paid him well), and to receive from him his reply to the communication brought by us from General Creagh, Mr. Grant and I proceeded on board, when the *Elphinstone* got promptly under weigh for Aden *via* Abd-el-Kuri, on which we desired to have one more hasty run.

Early on the 22nd we found ourselves at our old anchorage in Bandar Saleh, where we remained till the next evening. During our stay Grant was

fortunate in obtaining a second pair of the *Passer hemileucus*, the endemic sparrow of the island (Plate vii.), additional specimens of the fine cormorant figured on Plate vi., and a single individual of the starling which had eluded us on our former visit, and which, on proving to be distinct from the



GEBEL DRYAT (SEEN FROM ADHO DIMELLUS PASS).

Sokotran species, we have named *Amphylus creaghi*, in honour of the Resident of Aden, to whom we owed so much during our stay there. The remarkable Euphorbia, which I had observed on our first visit as covering the mountain side like a plantation of verdant processional candles, I was successful in rooting up, getting safely aboard with Jamah's aid, and in eventually transmitting in excellent condition to Edinburgh, where it still thrives.

What struck us very forcibly, after having seen the flora of Sokotra, was the absence here of so many of the characteristic plants of that island. Dragon's-blood, Frankincense, Myrrh, and Cucumber trees, *Adenium*, *Aloe*, Date-palms, *Eztecum*, *Dorstenia*, *Hypericum*, and many others were conspicuous by their absence.

On the evening of the 23rd of February we left for Aden, where we anchored late on the 25th. Two homeward-bound steamers, a P. & O. and a British India, were due within the next few days. By dint of incessant work our collections were packed, and all our arrangements made for departure by the 28th. The British India steamer *Ghoorkha*, luckily for us once more, arriving first of the two, on the morning of March 1st, we took passage by her. The P. & O. boat, which reached Aden a few hours later, to our chagrin passed us in the Red Sea the same evening travelling at a high speed. When we reached Suez, however, some days later, we left our rival behind us in strict quarantine with plague on board, lamenting, while we proceeded happily on our way to Marseilles, whence Mr. Grant and I travelled overland to London, leaving our taxidermist, Cutmore, to continue the voyage by the *Ghoorkha* to the Thames, in charge of the collections and baggage, which all came safely to the end of their peregrinations.

Zoology
of
Sokotra
and
Abd=el=Kuri

CHORDATA.
VERTEBRATA.

Mammalia.

By W. E. De WINTON, F.Z.S.
HENRY O. FORBES, LL.D.
W. R. OGILVIE-GRANT.

PLATE II.

Mammals.

The Mammalian Fauna of Sokotra had been very cursorily examined by former expeditions, and, with the exception of a Bat, all the Mammals hitherto recorded were such as had undoubtedly been introduced by man. It was therefore thought that some species truly indigenous might be discovered ; for it seemed to many highly improbable that an island in such a position could have been so long separated from the mainland of both Africa and Asia as would be suggested by the absence of all Mammals.

The present Expedition has failed in adding to the list, so it may now be said, with a fair amount of certainty, that Sokotra has no indigenous Mammals, and that with the exception of one or two Bats, which may occasionally find their way from the mainland, all the Mammals living on the island have been introduced by man.

The first list of the Mammals of Sokotra of modern times was given by Heuglin in Petermann's *Mittheilungen*, 1861, p. 149, in a general description of the island and its products. Camels, goats, wild or feral asses, and civets are mentioned as those most worthy of record, while jackals and gazelles are said to be found in the middle of the island. The two latter may now be disregarded, as no explorer has been able to find either on the island.

The small Mammals were first noticed in a report on Dr. E. Riebeck's collection by Dr. O. Taschenberg in the *Zeitschrift für Naturwissenschaften*, Halle, 1883, Vol. lvi. p. 160. In this list the Free-tailed Bat (*Rhinopoma microphyllum*) is recorded with a rat (*Mus albipes*), and a mouse (*Mus gentilis*).

The following notes on the Mammals obtained by the present Expedition suggest themselves to me ; the full list, with field notes, I leave in the hands of the collectors.

The Rasse (*Fiverricula malaccensis*) is of the form common to Java and Madagascar, distinguished under the subspecific name of *F. malaccensis rasse*, Horsf. (see J. L. Bonhote, *Ann. Mag. Nat. Hist.*, Ser. VII., Vol. i., 1898, p. 119). This animal is now found almost everywhere in the islands of the Indian Ocean and Malayan seas, being carried in ships and dhows for the sake of the civet which it yields.

The Rat (*Mus rattus*), of which a large series was obtained, varies in the shade of colour between the two forms found in India, *Mus flavesceus* of Elliott

and *M. rufescens* of Gray. This is no doubt the *Mus albipes* of Dr. O. Taschenberg's list.

The House Mouse may have found its way on to the island, but it is just possible that young specimens of the last mentioned species were taken by Dr. Taschenberg for *Mus gentilis*, the pale form of *Mus musculus* found on the borders of the Red Sea.

The African Ass (*Equus asinus*) was found in a perfectly wild state, and probably has lived thus for some thousands of years. Failing wild killed specimens of the true wild Ass from Africa, it is impossible to say whether the Sokotran animal has undergone any modification from the ancestral form.

The Mammalian Fauna of Sokotra, so far as known, comprises eleven species.

I.—Mammals of Sokotra.

CHIROPTERA.

EMBALLONURIDÆ.

Rhinopoma, Geoffr.

1. *Rhinopoma microphyllum*, Geoffr.

Rhinopoma microphyllum, Taschenb. Zeit. Nat. Wissensch. (4) ii. p. 169 (1883).

[Riebeck's Collection contained numerous examples of this species captured in the neighbourhood of Tamarida (or Hadibu). We did not meet with the species; and though constantly on the look-out for Bats, only once during the months we remained on Sokotra were we rewarded with a sight of one.

One night at Adho Dimellus (3,500 feet), while going round the sugared posts in search of moths, a small Bat flew several times across the front of the lantern within a few yards of me. It was not flying very fast and I saw it very clearly, but, of course, can only hazard a guess as to the species. By the time I had returned to the spot with a collecting gun the Bat was nowhere to be seen; and, even if I had succeeded in shooting it, it would probably have been lost among the grass and stones. It resembled and may possibly have belonged to the species *Hipposiderus tridens*, which is common in South Arabia.—*W.R.O.G.*]

CARNIVORA.

FELIDÆ.

Felis, Linn.

2. *Felis maniculata*, Cretzschm.

[We never succeeded in procuring or even seeing an example of the Wild Cat, though they were said to be fairly common in some of the rocky

valleys of the interior, and do considerable damage among the flocks, killing numbers of lambs and kids. An intelligent native, living in a valley to the south of Adho Dimellus, gave me a detailed description of the animal, which he said was fairly numerous in the neighbourhood. It apparently varies greatly in colour, some examples being striped or spotted like the Wild Cat, while others are mostly black. I gathered from what he said that all are feral descendants of tame cats which have been introduced into the island. There are a few domestic cats in Hadibu, and no doubt these, from time to time, have taken to the woods and gradually established a wild breed. Though not very large, they are said to be very strong and fierce, and are extremely difficult to trap. One which was actually captured in one of our native-made traps unfortunately managed to escape.—*H.R.O.G.*]

[There are no **House- or Sheep-Dogs** in Sokotra at the present day, and in neither the earliest nor subsequent accounts of the island is any mention made of their presence. This is rather remarkable, seeing that dogs are found in India, Egypt, Arabia, and Somaliland—the countries with which Sokotra has chiefly had intercourse,—and that by the Arabs they are employed in the herding of their flocks.—*H.O.F.*]

VIVERRIDÆ.

Viverricula, *Hodgs.*

3. *Viverricula malaccensis*, *F. Cur.*

[The Lesser Indian Civet Cat, which, like the other Mammalia in Sokotra, has been introduced, is fairly common in the mountains, though not very often seen. At most of our camps a few were in the habit of visiting our kitchen at night in search of bones and scraps, and our Somali cook, an enthusiastic sportsman, used to sit up for hours waiting for the chance of a shot. At Homhil he succeeded in killing a fine male, and we trapped two more. During our stay a couple were brought in by natives. The Arabs extract the civet secreted in the glands below the tail, and greatly esteem it as a perfume. When a cat has been caught, one man slips a string noose round its neck and pulls the head tight up against the wooden bars of the trap; a second man then pulls up the dropping door of the oblong cage, and, seizing the cat by the tail and hind legs, draws it out backwards, the man at its head paying out the required amount of line. The civet is then squeezed from the glands, between the man's finger and thumb, collected on the blade of a knife, and transferred to his naked forearm. After this operation is complete, the poor cat is allowed to escape, and the precious oil is carefully scraped up and placed in a small flat wooden box. Just before we left the island, one of our camel-boys came to my tent and wished to present me with a box of

civet. I declined it with thanks, and, though I promptly dismissed him, the strong musky smell remained in the tent for the rest of the day.

The following are the measurements of a pair:—Adult male—Head and body, 22 inches; tail, 13·75; hind foot, 3·75; ear, 1·7; weight, 7¼ lb. Adult female—Head and body, 19 inches; tail, 14; hind foot, 3·2; ear, 1·8.—*W.R.O.G.*]

RODENTIA.

MURIDÆ.

Mus, Linn.

4. *Mus rattus*, Linn. subsp. *rufescens*, Gray.

Mus rufescens, Gray, Charlesw. Mag. N. H. (U.S.) i. p. 585 (1837).

Mus flavescens, Elliott, Madr. Journ. Lit. Sci. x. p. 214 (1839).

Mus albipes, Taschenb. Zeit. Nat. Wissensch. (4) ii. p. 160 (1883).

[We found the Indian Tree-Rat common on all parts of Sokotra visited, from sea-level to an elevation of nearly 4000 feet. During the months we spent on the island they were decidedly more numerous among the hills than on the plains, and most common among the boulders on rocky hill sides. While at Dahamis, some natives informed me that one or two unoccupied huts were tenanted by rats, and I incautiously crawled in to set some traps. Though the business certainly did not occupy more than a few minutes, I found myself on emerging literally crawling with fleas! My traps in the huts produced nothing, though I caught plenty of rats among some neighbouring rocks.

These rats are evidently in the habit of climbing trees, for though we never actually saw them among the branches, they constantly visited live-traps set for birds on the tops of high bushes. This was clearly seen by their droppings. The traps being made of string netting they easily ate their way out.

The following measurements, all taken in the flesh from six adult specimens, may prove of interest:—

<i>Males.</i>	<i>Females.</i>
Head and Body, 146, 166, 172 mm.	Head and Body, 155, 145, 143 mm.
Tail, 188, 205, 190 „	Tail, 218, 208, 205 „
Ear, 22, 23, 23 „	Ear, 22, 22, 21·5 „
Hind foot (with-	Hind foot (with-
out nail), 32, 30, 33 „	out nail), 30, 30, 31 „

—*W.R.O.G.*]

[The variety, or subspecies, *rufescens* of the Common Black-Rat—the House- and Tree-Rat found over all India, and extending southward into the Malay Peninsula—occurs also in Arabia. Mr. O. Thomas, in his *Mammals from Oman* (*P.Z.S.*, 1894, p. 450), remarks that the

Tree-Rats, obtained by Dr. Jayakar at the foot of Jebel Akhdar, "seem to closely correspond with the Indian *M. rattus rufescens*, Gray." Some of these specimens were "bright rufous," and others "brown;" but all had "pure white bellies." Our specimens would seem to resemble more closely this brown form. In his well-known paper *On the Indian species of Mus* (*P.Z.S.*, 1881, p. 534), Mr. Thomas gives in his varietal characters of *Mus rufescens* the length of the body "just over 5 inches"; but it will be seen from the measurements of the six specimens set out above that two ♂ and one ♀ are over six inches long, while none of them are under $5\frac{1}{2}$ inches.

The occurrence of *Mus rufescens* in Sokotra is but a slight extension of its distribution, and is what might be expected, considering the continuous intercourse which from ancient times has subsisted between India, Arabia and Sokotra.—*H.O.F.*]

5. *Mus musculus*, Linn.

Mus gentilis, Taschenb. Zeit. Nat. Wissensch. (4) ii. p. 160 (1883).

Riebeck procured the Common Mouse at Hadibu, and Professor Balfour records its occurrence, but we did not meet with it.

UNGULATA.

EQUIDÆ.

Equus, Linn.

6.—*Equus asinus*, Linn., subsp. *africanus*, Fitz. (Plate ii.).

Equus africanus, Fitz., Sitzungsab. K. Akad. Wien. liv. p. 588.

[Though it had long been known that a wild ass inhabited the plains of Sokotra, no example had ever been brought to Europe, and it was consequently a matter of considerable interest to obtain specimens and determine the species. It was not until we were traversing the Garieh Plain, a wide stretch of bush-covered country extending from the base of the Haghier range nearly to the north coast, that we came across herds of these animals. We were then marching from our camp at Dahamis to a place called Kamahanu, and all suffering more or less from a severe attack of fever, probably contracted at our first camp on the Hadibu Plain. Towards evening our path led us over several streams, and here we saw quite a number of Wild Asses quenching their thirst or feeding in the open grassy glades near the water's edge. As they are never shot at and rarely molested by the natives, they were by no means wild, and allowed us to approach to within 50 yards without displaying alarm. Both Dr. Forbes and I were much struck with their beauty and by the perfect similarity in colour and markings of the large number seen. In all, the nose and a wide ring round the eye, as well as the chest and belly, were white, the legs nearly so, contrasting strongly with the mouse-coloured head and back, while the black stripes on the shoulder and down the middle of

the back, and a few somewhat irregular dusky rings round the legs, were clearly defined.

It was not until we had reached our camp at Jena-agahan, on the eastern slopes of the Haghier range, that we had an opportunity of obtaining specimens. Starting early one morning with two of our Somalis, and a camel to carry in the slain, I reached the plain about 10 o'clock, and, after a somewhat protracted search, discovered three asses having their midday siesta under the shade of some large stones. They proved to be an old female and two younger animals. When I got within about 80 yards they became aware of danger, and, jumping up, faced me, the white chest of the largest offering an easy mark. A bullet in the base of the neck dropped her stone dead, and the others at once galloped off, but, after running about 30 yards, suddenly halted and wheeled round. With a similarly placed shot the nearer of the two collapsed without a struggle. The third animal might easily have been bagged, but it would have been useless slaughter. After a couple of hours' hard work, we skinned the largest animal, and while thus engaged, with difficulty kept off a large number of Egyptian Vultures which had congregated round the other beast. The camel having meanwhile arrived, all hands were ordered to assist in placing the smaller ass on its back, but the camel-man, Mesingis, a half-bred Arab, at first absolutely refused, on religious grounds, to touch the carcase. Eventually his scruples were overcome, and we got back to our camp in the hills just as it was becoming dark. Poor Mesingis had rather a bad time of it with the other camel-men, who, on learning of his share in the day's work, refused to eat with him, and, in Arab fashion, sent him to Coventry!

On subsequent expeditions to the plains Dr. Forbes secured an adult male and female, and one of our Somalis shot a male, when the same religious difficulties were again encountered. So altogether we brought away five fine skins and were content, for the amount of labour in preparing these large animals is great. With a little trouble one might easily have bagged a score of Wild Asses in a day, for, never having been shot at, they were by no means shy, and it was rather unpleasant work killing the few we required as specimens.

There is certainly a small number of the domestic breed of Ass in Sokotra—Dr. Forbes saw at least a couple in Hadibu; but the young of the wild animals are also occasionally captured by the natives, and much esteemed as beasts of burden. We endeavoured on several occasions to purchase a living example for the Zoological Gardens in London, but none of the owners were willing to sell.

There can be little doubt that the Wild Asses of Sokotra are the feral descendants of animals imported many centuries ago. The natives, when questioned on the subject, stated that they have been there from time immemorial, and the entire absence of colour varieties among the number we saw leads us to believe that their statement is correct

They are remarkably sturdy, thick-set little animals, with beautiful, clean legs and remarkably small hoofs. If a number of Australian brood-mares were imported and turned out on the Garieh Plain there can be little doubt that valuable mules might be bred to supply the Aden market.

Unfortunately we neglected to take exact measurements in the flesh of all the animals killed. An adult female measured 6 ft. 6 in. from the tip of the nose to the end of the tail (without the hair), and the skins and a mounted example shew that they stand from $9\frac{1}{2}$ to 10 hands at the shoulder.—*H.R.O.G.*]

[In the *Proceedings of the Zoological Society of London* (for 1884, p. 540, Pl. L.), Dr. Selater gives a description, with a figure (fig. 1), of the Wild Ass which inhabits Somaliland, under the designation of *Equus asinus somalicus*. He there points out that, in possessing only a slight indication of a dorsal stripe, and in the absence of a cross-line on the shoulders, it is easily distinguishable from the species possessing both those characters inhabiting the deserts of Upper Nubia, which he shows ought to be known by Fitzinger's name of *Equus asinus africanus*. From the drawings he gives, and the description in the text, which together perfectly agree with the species seen by us in Sokotra, it is evident that the Wild Ass from both these localities belongs to the same species or subspecies. It is remarkable, therefore, that it is not the species geographically nearest to the island that occurs on Sokotra. When we remember, however, that the great trade route of ancient Egypt, and later of the Romans which started from Bernice, passed down the Red Sea to Arabian and Somaliland ports, this circumstance is less surprising. It is, consequently, by no means improbable that the progenitors of the Sokotran Wild Ass may have come actually from a Nubian port to their present home; and that the introduction of this race into the island may very likely date back to those far distant days. The difference of the *Equus africanus* from the common domestic breed strikes one at once. Among the animals employed in conveying our baggage from the shore where it was landed from the baghlah, to our first camp on the Hadibu Plain, was a donkey which at once attracted my attention, not only by the burden so disproportioned to its size which it carried (apparently without distress), but by its bright and sharply defined markings. It was only later that I recognised it as a tamed Wild Ass. When in Hadibu on January 31st, 1899, I saw my old friend and a couple of domestic 'mokes,' and the great contrast between them was at once strikingly evident. There is nothing of the 'moke' in the Sokotran Wild Ass.

The only wild species seen by Mr. C. V. Peel in Somaliland (Cf. *Somaliland*, 1900, p. 300) was the *E. asinus somalicus* of Selater. Mr. Peel has, however, designated it *Equus nubianus somalicus*!—*H.O.F.*]

[*Equus caballus*, Linn.

There are at the present day no horses in Sokotra, although in the seventeenth century they appear, from the interesting account that Sir Thomas Roe has left us of his visit to the island in 1612, to have formed part of its fauna, for he says : “The Sultan came down to the shore with about 300 men. . . . He was a-horseback, as well as two of his chief servants.”—*H.O.F.*]

BOVIDÆ.*Bos*, Linn.7. [*Bos taurus*, Linn.

The domestic cattle of Sokotra do not belong, as might have been expected, to the breed of the Zebu, or humped cattle of India (*Bos indicus*), nor to that of the broad-horned, heavy dew-lapped Gayal (*Bos frontalis*), another Indian breed, also humped, but doubtfully domesticated. They closely resemble in appearance European domestic oxen, except for their diminutive size. They are more like very small Alderneys than any other race, with perhaps a somewhat less developed dew-lap. The bulls are fuller in the head, broader in the forehead, and have a thicker neck than the cows. In colour they vary nearly as much as our home herds do ; they may be fawn, red, or these colours dappled with white, but they are more rarely dun or black. All their four legs below the knee are not infrequently white. The cows have small udders, with very short teats. Considerable variability exists in the form and dimensions of their horns, which are not, in proportion to the size of the animal, longer than those of the common mixed breed of cattle of European farmyards. They curve either forwards and outwards, or forwards and inwards. It is difficult to conjecture by whom and from what country these pretty cattle can have been brought to Sokotra, seeing that in none of the adjacent countries is a similar breed now found or known to have existed. It is probable they were already inhabitants of the island in the thirteenth century, for Marco Polo observes that the people of Sokotra lived on “flesh and milk,” which may, of course, apply to goats and camels as well as to cattle. The island, however, abounded in cattle in the middle of the sixteenth century, as Francis Xavier records.

Some further remarks on the origin of the Sokotran cattle, with illustrations of them, will be found in the *Narrative*.

It should be noted also that Sir Thomas Roe, in describing his visit to Sokotra in 1612, besides mentioning *Beeves*, remarks that he saw “the savage people . . . the ancientest natives of the place, riding about on **Buffaloes**,” but of what species they were, or from what country, Africa or India, they came, he is, unfortunately, silent.—*H.O.F.*]

Capra, *Linn.***8. Capra hircus**, *Linn.*

[The Wild Goat of Sokotra, mentioned by the late Mr. Theodore Bent and Mr. Bennett, proved to be a chimæra, for we ascertained beyond doubt that the only wild animals are feral examples of the domestic breed so common on the island. From what we had heard and read, we had been led to suppose that a really wild animal existed, and had fondly pictured a new species of *Thar* allied to that recently discovered in the mountains of Arabia. We were told by the natives that wild goats were only to be met with in the highest and most inaccessible parts of the Haghier range, and that when we reached our camp at Adho Dimellus, under the great granite peaks, there would be no great difficulty in procuring specimens. We saw plenty of goats in that neighbourhood; some our local guide forbade us to shoot at because they were tame, while others, obviously not his property, were pointed out as being undoubtedly wild. The tame and wild animals were quite alike, and every individual varied in colour and markings. Our guide having informed us that all the goats across a certain valley opposite our camp were wild, I acted on the information and took an early opportunity of shooting one. But the owner of the dead goat promptly appeared and made a terrible outcry, demanding ten dollars to square matters. Eventually, for the sake of quiet, he received three dollars, but after that goat shooting was voted an unprofitable amusement and a waste of time! We had with us, however, an Indian Sowar from the Aden troop, whose greatest pleasure was to take his rifle and start off for a long day in the hills. Twice he came back staggering under the remains of what was supposed to be an undoubted wild 'billy,' but, as on each occasion one or more owners shortly appeared and demanded payment, we were obliged to curb his love of sport by requesting him in future to leave his rifle at home. The only specimen preserved was a quite young female which we purchased from a native at Homhil before we had ascertained that the wild goat was a myth.—*W.R.O.G.*]

[The Domestic Goat of the Sokotri, of which the Sultan, the chiefs, and many of the Bedawin possess very large flocks—larger indeed than of sheep—is a much smaller breed than the European. It has rather long hair, which, as mentioned above by Mr. Grant, is of many colours. Many of them have remarkably large and long udders. The horns vary considerably in shape, size, and direction, but, notwithstanding the alluring descriptions of their great length and ornate form given us by more than one Bedawin, only here and there did we see a patriarch (generally stalking proudly in advance of a long file of his harem) with what might be termed a "noble" head. The introduction of the goat into Sokotra must date back to a period at least considerably anterior to the beginning of the

thirteenth century, a time at which the flocks of the Sokotri were already large.--*H.O.F.*]

Ovis, *Linn.*

[9. *Ovis aries*, *Linn.*

The domestic sheep of Sokotra, of which extensive flocks are possessed by the islanders, especially by the mountain Bedawin, are a degenerated stock. Though quite European in general aspect, they are all small, with thin legs, and bearing, it seemed to me, by no means an abundant fleece. Their wool is also poor and rather hair-like, the result perhaps of their long tropical residence and want of cultivation. With few exceptions all are black, and they reminded me very much of black sheep from the Scottish Highlands which had become dwarfed and wasted in body and face. Certainly, all the specimens we were able to buy for the table were small boned, and lean to a degree besides which did little credit to their pastures. Although in the Garieh Plain and on the high plateaux near Adho Dimellus I saw a good many sheep that had been shorn, wool appears not to be an article of export. We noted, as other visitors to Sokotra have done, the absence of the fat-tailed Ethiopian breed abundant in Africa, of which large numbers are annually imported into Aden, often by native craft, which occasionally call at Sokotra on the way. The Oman sheep, according to Wellsted, though small and black, have the tail larger than that of the European, but less than that of the Ethiopian breed. "The sheep of Arabia," Palgrave remarks, "are all more or less broad-tailed." The tail in the Sokotran breed is quite small. This is an additional instance of a member of the Mammalian fauna of the island not being represented by the species or race found in the nearest continental land.—*H.O.F.*]

CAMELIDÆ.

Camelus, *Linn.*

[10. *Camelus dromedarius*, *Linn.*

The Camel of Sokotra is the same, single-humped, species which is found in Arabia—whence it has been introduced—only of a somewhat stouter build. The physical characters of its new home differ considerably from those of its old. Here, instead of even sandy deserts, the "plains" that exist are invariably the roughest and most boulder-dotted tracts of country that can well be imagined; while nearly all the island paths, for they cannot be called roads, eventually rise over sharp rock-set or slippery precipitous ascents. To these altered conditions the habits of the camel have become perfectly adapted. Upon such difficult and dangerous ways, the goat-like agility and surefootedness of the beast claimed our

admiration from the first day we travelled with it, and the carefulness and sagacity with which it would pick its steps at all doubtful and awkward turnings, tended to raise its down-trodden character in our estimation. Although little of the country lends itself to a pace faster than a trot, yet over a clear stretch the Sokotran Dromedary seems as fleet as his Arabian brother.—*H.O.F.*]

CETACEA.

PHYSETERIDÆ.

Physeter, *Linn.*

[11. *Physeter macrocephalus*, *Linn.*

The Sperm Whale appears to have been a very frequent visitor to the neighbourhood of Sokotra, as “black ambergris” was one of the exports for which the ships of the East India Company traded there in the seventeenth century. Even as early as the thirteenth century the island produced “a great deal of ambergris.” This whale is not now so frequently met with in these seas as it was even half a century ago, when it abounded on the Arabian coasts, as did also “myriads of cuttle-fish and cephalopods of all kinds on which it fed.” Sir Henry Yule in his “Marco Polo” quotes the following extract from Mas’udi—a traveller and historian of the tenth century—as to the curious ideas of the Arabs in reference to this substance:—“The best ambergris is found on the islands and coasts of the Sea of Zinj [as the Arabs still call Zanzibar]; it is round, of a pale blue, and sometimes as big as an ostrich egg. . . . These are morsels which have been swallowed by the fish called Awāl. When the sea is much agitated it casts up fragments of amber almost like lumps of rock, and the fish swallowing these is choked thereby, and floats on the surface. The men of Zinj, or wherever it be, then come in their canoes and fall on the creature with harpoons and cables, draw it ashore, cut it up, and extract the ambergris.”—*H.O.F.*]

II.—Mammals of Abd-el-Kuri.

With the exception of a few small flocks of **Goats**, no mammals were found by us on Abd-el Kuri ; yet it is possible that some species may nevertheless exist there, for we had time to do little more than examine the plain between the two seas and part of the mountain range at the eastern extremity of the island. If it be the case that the “vermin” reported on Kahl Far’un by Captain Haines be rats, murine species may not improbably yet be found on Abd-el-Kuri, which is so close to it. Barbosa, writing in the sixteenth century, makes this remarkable statement :—“Near to this island of Sokotra there are two other islands. . . . In these two islands much amber of good quality is found, and many shells of the valuable and precious kind in the mine, and much Dragon’s-blood and Aloes of Sokotra, and there are large flocks of sheep and oxen.” The “two other islands” above mentioned evidently refer to Abd el-Kuri and probably Samneh, the larger of the group known as “The Brothers,” but while there still exists in the former a fishery for pearl shells of “the valuable and precious kind,” neither Dragon’s-blood trees nor Aloes, so far as we saw, grow upon it, and but little vegetation to support even small flocks of any sort. In explanation, we must suppose that Barbosa was writing from second-hand information, rather than believe that so great a change has come over the islands since his day as would be indicated by the disappearance of the long-lived, alpine, inedible, rock-loving *Dracena*, and the vegetation necessary to support many oxen. The remaining islets of the Sokotran Archipelago are even more barren than Abd-el-Kuri.—*H.O.F.*]

PLATE II.

WILD ASS OF SOKOTRA, p. 9.



WILD ASS OF SOKOTRA

CHORDATA.
VERTEBRATA.

Aves.

By W. R. OGILVIE-GRANT.
HENRY O. FORBES, LL.D.

PLATES III., IV., V., VI., VII.

Birds.

The results of the ornithological work done by us in Sokotra and Abd-el-Kuri may be summed up as follows :—

The number of birds collected by the Expedition was 437. Of these 41 specimens were obtained in the latter island during our two short visits, and 396 in the former. The species represented in the collection number in all 50, 10 from Abd-el-Kuri and 40 from Sokotra. Previous investigators of the larger island have recorded 20 species which were not secured by us, and none of which, save three, did we see ; but, on the other hand, we discovered eight species new to science, viz. :—

From Sokotra, *Fringillaria insularis*, [= *Emberiza septemstriata* (Scl. & Hartl.)].

Fringillaria socotrana,
Cuprinulgus jonesi,
Scops socotranus.

From Abd-el-Kuri, *Amydrus creaghi*,
Passer hemileucus,
Motacilla forwoodi.

From both islands, *Phalacrocorax nigrogularis*.

Moreover, the following nine species which had not previously been met with in the group were obtained by the Expedition, viz. :—

In Sokotra, *Otile obsoleta*,
Buteo desertorum,
Ardea cinerea,
Totanus calidris,
Tringa temmincki,
Scolopax stenura.

In Abd-el-Kuri, *Coracias ? abyssinicus* (skeleton),
Sula sula.

In both islands, *Pandion haliaetus*.

In addition to these, the following species unrecorded by other observers were seen ; but we were unable, for various reasons, to add them to our collection, viz. :—

In Sokotra, *Cypselus murinus*,
Upupa epops (probably),
Syrnium sp.,

	<i>Falco feldeggii</i> ,
	<i>Chenalopex egyptiacus</i> (probably),
	<i>Anous stolidus</i> .
In Abd-el-Kuri,	<i>Falco barbarus</i> (probably).
	<i>Larus fuscus</i> .
In both islands,	<i>Sula piscatrix</i> .

The female of *Amydrus frater*, hitherto unknown, was obtained; while *Rhynchostruthus riebecki* was proved certainly to be the adult of *R. socotranus*, thus fully confirming the determination of their identity made in 1888 by Dr. Bowdler Sharpe, in the *Catalogue of Birds in the British Museum*, Vol. XII. p. 282.

I.—The Birds of Sokotra.

PASSERES.

CORVIDÆ.

Corvus, Linn.

1. *Corvus umbrinus*, Hedenb.

Corvus umbrinus, Sclat. & Hartl. P.Z.S., 1881, p. 172; Hartl. P.Z.S., 1881, p. 955.

The Sokotri name is 'Aäireh', for one, 'Aäiroop', for a flock of, *Corvus*. 'Aädip', (*I. B. Balfour*).

This Raven is not very numerous, and in no part of the island did we find it abundant. About all our camps a few were seen from time to time, almost always in pairs, and at Homhil, where we obtained most of our specimens, it was, perhaps, commonest. As a rule, it was by no means wild, and when such savoury food as the body of a dead donkey or goat was to be had, a pair or two would soon put in an appearance, driving off the vultures till they had finished their meal. At Adho Dimellus a small flock of seven visited the neighbourhood of our camp on two successive days, attracted by the carcase of a dead goat. The harsh croak of this species is much like that of the Common Raven, but not so deep.—*W.R.O.G.*

STURNIDÆ.

Amydrus, Cab.

2. *Amydrus blythi*, Heugl.

Amydrus blythi, Sclat. & Hartl. P.Z.S., 1881, p. 171; Hartl. P.Z.S., 1881, p. 955.

The Sokotri name is 'Shêlhê'. 'Shilhay', (*I. B. Balfour*). 'Aroab', (*Wellsted*).

This handsome Starling was common on all parts of the island visited by us. On the Hadibu Plain it was constantly to be seen in pairs and in

small flocks, but on the granite mountains surrounding our highest camp, at Adho Dimellus (3,500 ft.), it was perhaps most numerous. During the daytime the birds might be met with in all sorts of places, on the plains, and patches of open grass, as well as on the bush-clad hill-sides, but just before sunset they all retired to the neighbouring precipices, and might then be seen far overhead in pairs and flocks on their way to roost. At Jena-agahan, one of our camps in the Haghier range, small flocks were constantly to be seen just before sunset, circling round above the granite peaks, much after the fashion of the Common Starling, and uttering their shrill, rather discordant cry, as they flew.

Their food is very varied, consisting of grasshoppers and other insects, as well as fruits of all kinds, especially figs, and the berry of the Dragon's-blood tree. Compared with the allied *A. frater*, birds of this species are wild and much more difficult to approach. They are, moreover, remarkably tenacious of life, and I generally found a twelve-bore more effective for procuring specimens than the small collecting gun. When feeding in pairs, or small flocks, one bird, as a rule a male, is generally on the watch for danger, and keeps a sharp lookout from some bush or rock, while the rest are engaged in gobbling large grasshoppers or other delicate morsels. On the high grass-flats round Adho Dimellus there were some fine cattle, and every evening the herd might be seen accompanied by numbers of this Starling, either following them as they fed, or perched on their backs, busily engaged in searching for vermin. The actions of this bird, both on the ground and in trees, are like those of a Blackbird; it does not walk like the Common Starling, but hops, and when jumping from branch to branch the carriage of the long tail increases the resemblance. The nesting season was apparently over when we reached Sokotra early in December, for though we saw a number of old birds accompanied by young, none seemed to be nesting. Probably one egg is the full clutch, for we never saw the parent birds with more than one young bird. Several of the latter were secured, and an interesting point with regard to their plumage is that the young female has the head and neck black like those of the male parent, the grey plumage of the adult female being subsequently assumed. The call-note of this species *Chêe-chêe-chêe*, *chê-whoûp*,



Chêe - chêe - chêe - chê - whoûp.

uttered loud and quick, is much harsher, and quite different from that of *A. frater*. The female, when suddenly alarmed, emits a curious, harsh "sraich," not unlike that made by the Jay.

The natives do not distinguish this species from *A. frater*, the Sokotri name for both being the same.—*W.R.O.G.*

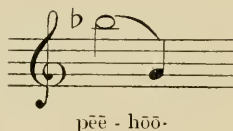
Dr. Blanford mentions in his *Geology and Zoology of Abyssinia* that *Amydrus blythi* was met with between 3000 and 4000 feet, while the temperate regions, from 7000 to 8000 feet, were occupied by *Amydrus albirostris* (*Pilorhinus albirostris*, Cabanis). In Sokotra we obtained *A. blythi* quite abundantly from sea level to 4200 feet, and Mr. Lort Phillips records (*Ibis*, 1898, p. 395) that (in 1897) he found a flock of this species "in the gardens at the Dobar springs, eight miles inland from Berbera," although he had previously noticed them "only on the upper ledges" of the Goolis Mountains in Somaliland.—*H.O.F.*

3. *Amydrus frater*, *Sclat. & Hartl.*

Amydrus frater, *Sclat. & Hartl. P.Z.S.*, 1881, p. 171; *Hartl. P.Z.S.*, 1881, p. 955.

The Sokotri name is 'Shêlhê.'

As only a single male of this Socotran species had been discovered during Professor Balfour's visit in 1881, we were naturally anxious to obtain examples of both sexes, and ascertain whether the plumage of the female differed from that of the male. It subsequently transpired that this was not the case—both sexes being similar in appearance. During our stay in the neighbourhood of Hadibu, I never came across the species, but may possibly have overlooked it among the numbers of *A. blythi* that daily frequented the plain. This is, however, unlikely, for both species were almost always in pairs or small flocks, and the grey-headed females of *A. blythi* were conspicuous at a long distance. After a brief acquaintance with the two species, one never had any difficulty in distinguishing between them. A pair of entirely black-plumaged starlings might safely be put down as *A. frater*, and if one wanted further evidence, the much larger bill and shorter tail—a character specially conspicuous in flight—afforded ample proof. The call note,



is a clear, soft, bell-like sound, easily distinguished from that of *A. blythi*, but, like that species, the female utters a harsh, Jay-like "seraich" when wounded or suddenly alarmed. The behaviour of the present species is, moreover, very different from that of Blyth's Starling. It is much tamer, and allows one to approach quite close without displaying any trace of alarm. The two species may occasionally, perhaps accidentally, be found associating with one another, while feeding, but, as a rule, they are met with separately. The first example we obtained was a male shot at Jena-agahan, on the

lower slopes of the Haghier range. A pair of black-headed birds, conspicuously different from Blyth's Starling, with which I was already well acquainted, lit on a tree close by, and my attention was at once attracted by the different note. Unfortunately, I only had time to secure one—the male—and it was not until we reached Homhil, at the east end of the island, that female examples were procured. Both there and at our highest camp, Adho Dimellus, this bird was fairly common. A few pairs were met with, accompanied in every case by only one young bird, and it may thus be assumed that only one egg is laid at a sitting.—*W.R.O.G.*

FRINGILLIDÆ.

Passer, *Briss.*

4. *Passer insularis*, *Scat. & Hartl.*

Passer insularis, Scat. & Hartl. P.Z.S., 1881, p. 169, pl. xvi.

The Sokotri name is 'Eseféro' or 'Eseviro.'

The Sokotran Sparrow is by far the most abundant species on the island, being extremely common and very tame on all parts visited, and equally numerous from sea level to an elevation of 4000 feet. When we got to Sokotra on the 8th December the nesting season was practically over. Many pairs, accompanied by young broods of fully-fledged birds were to be seen on the Hadibu Plain, especially among the Date-palm groves bordering the rivers at Hadibu and other villages near the coast.

On Gebel Raggit to the south-west of the plain, several pairs were seen flying in and out of their nests situated in the fissures of a huge perpendicular rock, and were evidently engaged in feeding their young. The only occupied nest examined was one placed in a narrow slit in a rocky place above our camp at Adho Dimellus. It was made of dead grass, lined with a quantity of feathers, and perfectly similar to that of the Common Sparrow. It contained three naked young, about five days old, and these were apparently a very late brood, for wherever one went numbers of full-fledged young, often accompanied by their parents, were to be found. I examined a number of other nests at various places, but invariably found them empty, and one's trouble was never rewarded by so much as an addled egg. The habits of this bird and its mode of life do not seem to differ from those of the Common Sparrow. The notes, too, are much the same, but the "chirp" is decidedly sharper. On one occasion at Jena-agahan I was stalking the female of a magnificent butterfly (*Hypolimnas jacintha*) among the huge boulders of a dry watercourse. When almost within striking distance a cock Sparrow began to mob me, and so determined and noisy was his attack that I looked up, missed my footing, and lost the chance of taking one of the rarest insects in Sokotra. Greatly incensed by such an unprovoked assault, I got my collecting gun, and

shot the offending bird. I was lucky enough to capture the butterfly next day, within a few yards of the same spot.—*W.R.O.G.*

Both sexes have the iris brown, the bill black and the legs and feet fleshy horn-colour.

Rhynchostruthus, *Sclat. & Hartl.*

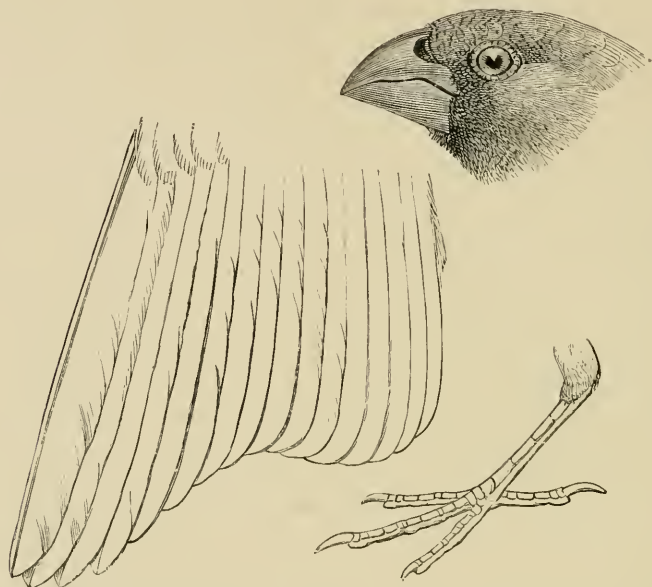
5. *Rhynchostruthus socotranus*, *Sclat. & Hartl.*

Rhynchostruthus socotranus, *Sclat. & Hartl.* P.Z.S., 1881, p. 170, pl. xvii. and woodcut.

Rhynchostruthus riebecki, *Hartl.* P.Z.S., 1881, p. 954, pl. lxxii.

The Sokotri name is 'Dehaudāri.'

FIG. 1.



HEAD, WING, AND LEG OF THE YOUNG OF *RHYNCHOSTRUTHUS SOCOTRANUS*.

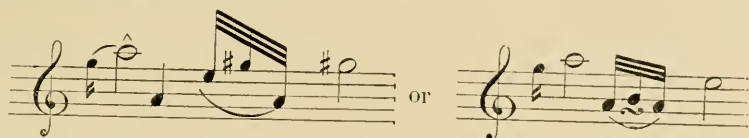
(From the Proceedings of the Zoological Society of London.)

I had long suspected that the description of this species had been drawn up from skins of immature birds, and that the second species (*R. riebecki*), subsequently described by Dr. Hartlaub, was merely the fully adult bird of *R. socotranus*. Our observations in Sokotra, and the fine series of adult and immature birds obtained there, prove beyond doubt that this is the case.* We first met with the Sokotran Grosbeak on the 18th December in the Addah valley, to the east of the Hadibu Plain, where our taxidermist, Mr. Cutmore, secured an immature bird in the striped plumage of *R. socotranus*. At the same time I observed an adult bird with the black and white head

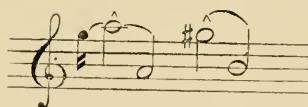
* cf. Sharpe, Cat. Birds, Brit. Mus., xii p. 282.

(*R. ri-becki*) in the act of feeding a second immature bird 'in striped plumage similar to the one already shot. In attempting to kill both these with one shot, I unfortunately secured neither, and they disappeared into the thick jungle, where it was hopeless to follow them up. This first meeting clearly showed the birds' relationship to each other. No further specimens were obtained till the 14th January, when Dr. Forbes shot on Gebel Bitzobur a specimen in the transition stage, with some striped feathers and a black throat, which was final proof of the identity of the two forms.

The clear ringing whistle of the adult male, viz. :—



uttered at short intervals, can be heard at a considerable distance, and is one of the most pleasing of the many bird-voices to be heard among the hills in the early morning. Another variety of the song,

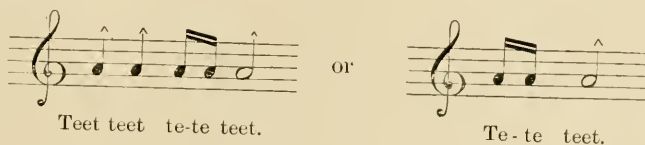


is not infrequently uttered by the male, while feeding during the afternoon, but I never heard it in the morning. Just after sunrise numbers commence to sing, but as the sun gets high, and the birds scatter over the jungle-covered hill-sides to feed, the concert gradually dwindles. About mid-day, when the birds have fed, the male may often be found resting in some thick bush, singing quietly to himself—the song uttered at this time being a prolonged twittering, very agreeable to listen to, and much like that of the Common Goldfinch. Both adult and immature males sing in this fashion while resting. The old male when ‘tuning up,’ or flirting with the female, makes a piping sound,



Pēē - youp.

much like the Bullfinch, and, at the same time, puts his tail on one side and puffs out the feathers of his sides and flanks. The call-note when feeding or alarmed,



is uttered by both male and female, and another note is a rather harsh Sparrow-like chirp.

This bird was fairly common in the Addah Valley, to the east of the Hadibu Plain, and I never visited this spot without obtaining specimens. It was, however, quite exceptional to meet with individuals in fully adult plumage, and though adults of both sexes were occasionally shot at this place, the great majority were immature birds with striped breasts, in various stages of plumage. On the Garieh Plain, and in the Goahal Gorge, at Homhil, Jena-agahan, and in the Dinehan Valley, adults were equally scarce. On the other hand, at our highest camp at Adho Dimellus, adults were numerous, but I only on one occasion came across an immature bird in their company at an elevation of about 4500 feet. It would thus seem that most of the adult birds frequent the high ground, while the majority of immature birds are met with in the middle and lower valleys. They were generally found feeding in small lots of one to three, and sometimes in larger companies, often associating, but never mixing with the flocks of Sparrows (*Passer insularis*). I had exceptional opportunities of studying the habits of this species at Adho Dimellus. Large numbers came in every night to roost in the dense bush covering the sides of the valley below our camp. During the day they were scattered all over the hillsides and valleys of the surrounding country, and generally met with singly or in pairs, though occasionally in small flocks. The loud ringing song of the male, being audible at a long distance, made it no very difficult matter to fall in with him, but the female was much more difficult to obtain. The male generally feeds and sings on the higher branches of the bushes, but the female frequents the lower and thicker parts of the jungle, and is generally silent, though she occasionally utters a call-note, *Te-te-teet*. It is generally easy to shoot the male, though they are by no means very tame, but the female beats a hasty retreat, never waiting to see what has befallen her mate, and the best plan of obtaining the pair is to wait till one has an opportunity of shooting the female first, the male being then easily secured.

The nesting season of this species was evidently over, for the youngest birds shot were fully feathered, and all the females examined had the ovaries small, and were evidently not breeding. The food consists chiefly of seeds and small fruits; those of a *Croton*, and the small red berries of an abundant laurel-like tree being their favourite food. On one occasion I came across four old birds feeding in some thick jungle on the high ground to the north-east of Adho Dimellus. After watching their movements for some time, one of the party (a male) took wing and passed over my head with a curious fluttering flight, uttering as he flew the twittering Goldfinch-like song. He flew so slowly that he almost seemed to be hovering in the air, and presently settling on a dead Dragon's-blood tree, fell a victim to science. The

female, startled by the shot, but unable to localise the danger, instead of beating a hasty retreat, lit on the same tree, and joined her mate. The other pair were also collected. I hoped that the first pair might be breeding, but a careful search for the nest proved fruitless, and subsequent dissection showed that neither of the females were breeding birds. About 5 o'clock in the evening the birds began to return to their roosting place in the valley below our camp, and an hour later the covert was full of them. They came in with a swift, direct flight, occasionally uttering their call note as they flew. Being very anxious to secure this bird alive, we tried to catch them with small "clap-net" traps, baited with seed, and placed on the top of the bushes where they came daily to feed: but the only visitors were rats, which sprung the traps and escaped.—*W. R. O. G.*

Drs. Selater and Hartlaub, in their paper on the birds collected by Prof. I. B. Balfour in Sokotra, remarked that it was their impression that *Rhynchostruthus* would eventually be "found on Cape Guardafui." Mr. Lort Phillips has since then recorded a closely allied, but smaller species, *R. louise*, from Somaliland, with a less powerful bill and without a white cheek-spot.—*H. O. F.*

Fringillaria, Sw.

6. *Fringillaria insularis*, Grant & Forbes. (Plate III. fig. 2, ♂ ♀).

Emberiza septemstriata, Selat. & Hartl. (nec Rüpp.) P.Z.S., 1881, p. 171 :
Hartl. P.Z.S., 1881, p. 955.

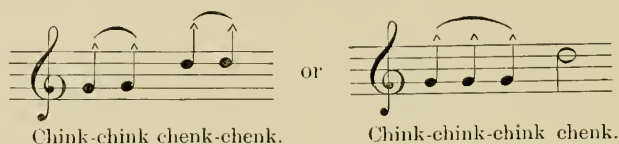
Fringillaria insularis, Grant & Forbes, Bull. Liverp. Mus. II. p. 2 (1899).
The Sokotri name is 'Thlafhan.'

Adult male:—Most nearly allied to *F. talapisi*, from which it differs in having the inner margin of the secondaries devoid of rufous, and the general colour of the chest and rest of the under parts pale brick colour, instead of dull rufous chestnut. Iris brown; culmen blackish horn; cutting edges of the upper and the whole of the lower mandible orange yellow; tarsi and feet flesh-colour; claws blackish horn. Total length (measured in the flesh), 5·2 inches; culmen, 0·38; wing, 2·9; tail, 2·2; tarsus, 0·6.

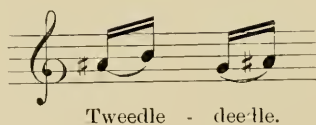
Adult female:—Similar to the female of *F. talapisi*, but the inner margins of the secondaries are devoid of rufous, and the chest and rest of under parts are pale brick-colour. Total length (measured in the flesh), 5·2 inches; culmen, 0·4; wing, 2·8; tail, 2·25; tarsus, 0·62.

This Bunting was common on all parts of the island visited by us, being numerous on the plains at sea level, and met with, though in decreasing numbers, up to an elevation of at least 4,000 feet, where its place is taken by the next species, *F. socotrana*. The females are much less frequently seen than the males, and are much wilder and more difficult to obtain. The food consists chiefly of fine grass seeds and the seeds of various bushes. Many pairs were met with on the

Hadibu Plain in the beginning of December, but I had not the good fortune to find a nest till later. The first nest I found was at Hombil on the 20th of January. It was situated close to the side of a goat track in thin Boxwood jungle interspersed with large Dragon's-blood trees, and consisted of a slight structure of twigs and grass stems, lined with finer grass, partially hidden by a small Boxwood bush at the root of which it was placed. The three small eggs had the ground colour greyish-white, very thickly spotted, especially towards the larger end, with chocolate-brown. Being uncertain whether three was the full complement of eggs, I determined to leave the nest until the next day, but when I went to inspect it early the following morning, I found to my disgust that one of the eggs had hatched. While Dr. Forbes was engaged in photographing the nest, I obtained both the old birds. On the 24th of January I was fortunate enough to find two more nests of this species. The first, containing three very slightly incubated eggs, was placed beneath a granite boulder (Fig. 2) on a rather bare and open hillside dotted with Cucumber-tree. In the second nest there were two well-feathered young birds and *one perfectly fresh egg*. In both cases the parent birds were shot for identification. In the second week of February several pairs were met with at Adho Dimellus, at an elevation of about 4,000 feet, and were generally accompanied by three young birds. There can be no doubt that three is the full number of eggs laid at a sitting. The male has a sharp metallic call—for it can scarcely be called a song—not unlike that of the Yellow Hammer (*Emberiza citrinella*)



which is uttered frequently and at short intervals from trees and stones, or from the ground whilst feeding. A peculiar crooning alarm note



commonly uttered by the female, and sometimes also by the male, may be imitated very fairly by producing the sound nasally.—*W. R. O. G.*

Drs. Selater and Hartlaub identified (*P.Z.S.*, 1881, p. 171) the *Fringillaria* obtained by Prof. Balfour in Sokotra as *F. septemstriata*, of Rüppell, and Sharpe in the XIIth volume of the *Catalogue of Birds*, after further comparison referred it to *F. tahapisi*, but it now proves to be a distinct species. *F. tahapisi*, which extends from Equatorial Africa to

FIG. 2.

NEST OF FRINGILLARIA INSULARIS.



the Cape, has been discovered in Somaliland by Mr. Lort Phillips, so that the nearest ally to the Sokotran species is also its near geographical neighbour (cf. Grant, *Ibis*, 1900, p. 137).—*H.O.F.*

7. *Fringillaria socotrana*, Grant & Forbes. (Plate III. fig. 1.)

Fringillaria socotrana, Grant & Forbes, Bull. Liverp. Mus. II. p. 2 (1899).

Adult male.:—A very distinct species, most nearly allied to the male of *F. insularis*, from which it differs in having the rump feathers tipped with white forming a conspicuous white patch. The wing-coverts and basal half of the outer edge of the secondaries dull rufous chestnut; the chin and throat white; the chest and upper breast dull rufous chestnut; the lower breast, belly, and under tail-coverts whitish. Iris dark brown; culmen blackish horn; cutting edges of the upper and the whole of the lower mandible orange yellow; tarsi yellowish flesh; toes dusky; claws blackish horn. Total length (measured in the flesh), 5·25 inches; culmen, 0·38; wing, 2·75; tail, 2·2; tarsus, 0·65.

Adult female.:—Similar to the male. Total length (measured in the flesh), 5·0 inches; culmen, 0·38; wing, 2·6; tail, 2·2; tarsus, 0·65.

Though I believe I saw this Sokotran Bunting on the top of one of the high limestone hills above our camp at Homhil, it was not until we reached Adho Dimellus, at an elevation of about 4,000 feet, that I obtained a specimen. At the latter place I soon became aware of the presence of a strange bird, being attracted by its ringing and somewhat metallic notes, which floated across the valley to our camp from the distant ledges of the opposite precipice. It was, however, some days before I obtained the first specimen. The bird appears to feed entirely on the fine grass seeds growing on the almost inaccessible ledges of the highest granite peaks, and, for this reason, is extremely difficult to obtain. On the 6th of February, I had gone up to a big granite peak above our camp in pursuit of *Papilio bennetti*. While waiting for an opportunity to catch this most evasive butterfly, I saw what at first sight appeared to be a male of *F. insularis*. The bird was quietly feeding on tiny grass seeds on a narrow ledge above me. All of a sudden it flew on to another ledge, and as it did so gave vent to the song I had so often heard from the inaccessible precipice opposite our camp. The bird then disappeared into a little recess in the rock, and taking the collecting gun from my boy, I made the best of my way to a ledge above the place where I had seen it disappear. When it flew out, I shot it, and found to my great delight that it was apparently a new species of *Fringillaria*. It was disappointing not to find a nest, but the bird was evidently merely feeding. Being naturally anxious to obtain further specimens of so fine a bird, and also to shoot the hen, the first specimen proving to be a male, I lost no opportunity of hunting for it during the remainder of our stay. The following morning I heard another male, and after following miles over the tops, finally shot it on a very steep face over a deep valley;

it dropped on to a ledge, whence it was quite impossible to retrieve it, but returning later with one of our camel-men, he succeeded in securing it after several attempts. On the 10th, I again heard a male on the high ground to the north of our camp, and after a two hours' chase over rocks and through thick bush, secured it. This bird, when shot, was sitting on a small tree uttering its ringing metallic notes at short intervals. From the 12th to the 14th heavy and continuous rain kept us all in camp, but early on the morning of the 15th of February, the weather having cleared, I was pleased to hear this bird singing on some ledges not far from our camp. Following up the sound, I soon had the luck to fall in with a pair, and to secure both. The female exactly resembled the male in plumage, but had the abdomen entirely bare; she had evidently nested, and, judging from the condition of the ovary, would have laid again in about three weeks.* She uttered no note of any sort while I watched her. The song of the male



Huë - he hu - hey (whistled).

is singularly like that of *Rhynchostruthus socotranus*, and may at first be mistaken for it. It is, however, more metallic, and one was soon able to distinguish between the two at almost any distance.—*W. R. O. G.*

PLOCEIDÆ.

Professor Balfour, in the very interesting "Introductory Chapter" to his *Botany of Sokotra*, makes the remark: "All over the island Weaver Birds, Chats . . . abound." No species of *Hyphantornis* or other member of the family came under our notice, however, in Sokotra or Abd-el-Kuri. One is rather surprised not to find them there, as Weaver Birds are plentiful in S. Arabia and Somaliland, and are good flyers. In the Cocos-Keeling Islands in the Indian Ocean I found nests of *Ploceus atrigula* which from time to time (as Mr. Ross, the proprietor of the islands, informed me), visited the atoll and bred there. They must have come from Java or Sumatra, which is a much greater distance than that of Sokotra from Africa or Arabia.—*H. O. F.*

ALAUDIDÆ.

Pyrrhulauda, *Smith*.

8. *Pyrrhulauda melanauchen*, *Cub.*

Pyrrhulauda melanauchen, *Scat. & Hartl. P.Z.S.*, 1881, p. 172: *Hartl. P.Z.S.* 1881, p. 955.

The Sokotri name is 'Keufia.'

We met with few examples of this Finch-Lark on Abd-el-Kuri, and found

* The body was preserved in spirits.

them shy and difficult to approach, but on the plains and low valleys of Sokotra they were extremely numerous and very tame. The melancholy wailing note is almost the first sound one hears in the early morning before sunrise, and the last at night. When we first arrived in Sokotra the birds had apparently not begun to breed, the ovaries of the females shot being but little developed, but during January and the early part of February, while we were on the higher ground, they must have nested, for on our return to Hadibu on the 18th February, we obtained very small nestlings, and numbers of recently fledged young were to be seen with their parents feeding on the stony plain. Two is apparently the full clutch in each nest, for though no eggs were found, we obtained several nests, each containing a pair of nestlings, and the same number of young were noted among family parties already on the wing.

The black-breasted males are remarkably handsome birds, and may constantly be seen on the wing, mounting into the air in wide circles like our Sky-lark, but seldom attaining any great height from the ground. Their hovering, floating flight is often remarkably bat-like, and this resemblance is intensified by the black colouring of their underparts. The song is varied and very pleasant, but never long sustained, the birds after a few minutes descending to the ground or settling on the top of one of the low bushes. On the Hadibu Plain they were so tame that they would often allow one to pass within a few yards of them without moving. Just before leaving the island I shot a female in very curious plumage. I observed what I took to be an old male accompanied by *three* fully-fledged young—a male and two females. Being struck by the unusual number, and in want of immature specimens, I shot all four, and then turned my attention to look for the female, but she was nowhere to be seen. Subsequently, when skinning these birds in camp, our taxidermist, Mr. Cutmore, called my attention to the fact that the bird I had taken for a young male was in reality the female parent. Her breast was strongly mottled with black feathers like those of the male, but the ovary was normal and in no way diseased.—*W.R.O.G.*

MOTACILLIDÆ.

Anthus, *Bechst.*

9. *Anthus sordidus*, *Rüpp.*

Anthus sordidus, *Scat. & Hartl. P.Z.S.*, 1881, p. 167.

The Sokotri name is 'Degäsagus.'

This large Pipit was very common on all parts of Sokotra visited, being almost as numerous at an elevation of 4000 feet as it was on the plains and low ground near the sea. It was perhaps the tamest bird on the island, generally allowing one to pass within a yard or two without showing the slightest trace of alarm. When we arrived the breeding season had already commenced, for on the 11th of December, with the

aid of my butterfly net, I caught young birds just able to fly, and on the 16th of the same month found a nest containing four slightly incubated eggs. The nest, a slight structure of fine dry grass, was placed at the foot of a thick plant of bush-grass, and so well hidden that it would certainly have passed unnoticed had not the female left her eggs.

At Adho Dimellus, 3500 feet, I found another nest with three perfectly fresh eggs on the 8th of February. Observing a pair of Pipits showing signs of unusual anxiety at my presence, it seemed worth while to hide and watch them, and after waiting for some time the female went to the nest. On this occasion it was placed under a tuft of coarse grass in a glade between some thick bush, and probably the full complement of eggs had not been laid. The male bird sings a sweet song perched on the top of a bush or rock, and, like other members of the genus, frequently arises with quivering wings to a considerable height in the air, singing as he flies, and descending after some minutes to his former perch.

At Jena-agahan, one of our camps in the Haghier range, there was a delightful male Pipit which used constantly to sing on a rock just in front of my tent, and his proximity afforded me great pleasure during a slight attack of fever. On coming back one evening I missed him, and found with regret that his skin had been added to our collection. The habits of this species are much like those of the Common Meadow-Pipit, but its actions, especially when feeding on the ground, are heavier and slower. During our stay on the island Pipits were generally met with in pairs, and on the more open parts of the country the males might often be seen chasing the females in and out among the boulders and patches of bush, and flying at a great pace.—*W.R.O.G.*

Iris brown; bill blackish horn except the basal part of the lower mandible, which is whitish horn; legs and feet fleshy horn colour.

Motacilla, Linn

10. Motacilla alba, Linn.

Motacilla alba, Scat. & Hartl. P.Z.S., 1881, p. 167.

This Wagtail was fairly common in Sokotra, both on the Hadibu Plain and about the Dimichiro Valley. A few were also met with on the higher ground at Hombil.

11. Motacilla flava, Linn.

Budytes flarus, Scat. & Hartl. P.Z.S., 1881, p. 168.

We did not observe this species in Sokotra.—*W.R.O.G.*

Professor Balfour obtained three skins of the Blue-headed Wagtail; but he saw it only on the mud flats extending inland a short distance from the head of Khor Garieh.

NECTARINIIDÆ.

*Cinnyris, Cuv.*12. *Cinnyris balfouri*, *Sclat. & Hartl.**Cinnyris balfouri*, Sclat. & Hartl. P.Z.S., 1881, p. 169, pl. xv. fig. 2.*Nectarinia balfouri*, Hartl. P.Z.S., 1881, p. 954.

The Sokotri name is 'Degäsagus.'

The Sokotran Sun-bird is fairly common in all the bush-clad valleys and on the slopes of the hills from nearly sea-level to an elevation of at least 4000 feet. Being an extremely noisy and vivacious little bird, constantly on the move in search of insects, it can scarcely escape notice. During our stay on the island this species was generally met with in pairs, and though some must have been nesting (for towards the end of our stay we shot more than one female evidently on the point of laying), the majority had apparently not commenced to breed. Though I was constantly on the look-out for nests, and, with this end in view, spent a good deal of time watching the movements of various couples, I only found one nest on the 10th February from which the young had already flown. This was of the usual bag-shaped type, exactly like the one found by Professor Balfour, and figured in the P.Z.S., 1881, pl. xv. It was suspended among thick bush and creepers, and very difficult to see. On the 5th February, in the low bush-jungle above Adho Dimellus, at an elevation of at least 4000 feet, I came across a family party of Sun-birds, including two or three young, which, though well-grown and able to fly, were still being tended by their parents. The latter were extremely solicitous for the safety of their offspring, and at once hurried them off into the thickest covert, the male appearing on the tops of the bushes from time to time, and uttering shrill, rather hoarse alarm notes. The song of this bird is wonderfully loud and varied, and it would be a hopeless task to convey any idea of its many changes by notes of music. To appreciate it one must see the beautiful little male with his grey and white plumage, ornamented with yellow side-tufts, perched on the highest twig of some bush, pouring forth his whole heart in a sustained flow of melodious sound. It took me a long time to master most of the call-notes, and even when one thought one had learned all, some new sound would often cause a weary climb only to find some little rascal of a Sun-bird. In addition to his endless *repertoire*, this bird is a capital mimic, imitating the calls of some of his neighbours with great accuracy, especially that of *Cisticola incana*. The males might constantly be seen chasing one another, or the females, up and down the hill sides, their flight on these occasions being rapid in the extreme, and the pace at which they can wheel and turn incredible. The sound produced by their wings when flying is loud, and quite unlike that of any other bird on the island, and one soon got to know the peculiar "thrip, thrip" of a passing sun-bird. We never obtained any birds in immature plumage, and all those

collected appeared to be perfectly adult, so I conclude that the young attain the adult plumage at the first moult.—*W.R.O.G.*

Iris reddish brown; bill and legs black. Total length (measured in the flesh) 5·5 inches.

ZOSTEROPIDÆ.

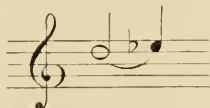
Zosterops, *V.* & *H.*

13. *Zosterops abyssinica*, *Heugl.*

Zosterops habessinica, Scat. and Hartl. P.Z.S., 1881, p. 168: Hartl. P.Z.S., 1881, p. 954.

The Sokotri name is 'Degirikum.'

The Abyssinian Silver-eye was fairly plentiful on all parts of Sokotra, being equally common in the low bush-clad valleys near the sea, and at an elevation of at least 4,500 feet, where the bush ceases. It was generally met with in small parties of two or more, and in its habits reminds one strongly of the Cole-Tit. Its call-note, uttered when feeding and on the wing, is, moreover, so exactly like that of the latter bird that, when first heard on Gebel Raggit, to the west of the Hadibu Plain, imagination pictured some unknown species of Tit. It is an active, lively little bird, seldom still for a minute, and constantly searching for small insects among the branches of the bushes and trees. The nesting season must have been practically over when we arrived on the 9th December. On the 17th of that month I fell in with a family party of five, including three young birds. Though able to fly well, they were still being fed by their parents, and it was a pretty sight to watch these beautiful little birds portioning out the dainties they collected with such amazing rapidity. They were so tame that one could observe them from a distance of a few yards without disturbing them. At Jena-agahan, on the 1st January, I again saw and obtained a female feeding two young birds just able to fly. Though constantly on the look-out for a nest of this species, I never succeeded in finding one. On the high ground at Adho Dimellus, I feel sure a pair had a nest, probably containing young, for they displayed quite unusual agitation, and continued to mob me while I unsuccessfully searched the neighbouring bush. When alarmed they keep up a constant scolding note, "Chū-è, chū-è, chū-è,"



Chū - è.

bustling about among the bushes, and are often extremely annoying to the naturalist, for they give the alarm to all the neighbourhood, sometimes spoiling one's chance of approaching other desirable birds. Generally speaking, however, when moving quietly about among the

bush, they take very little notice of one, and are so tame that they may often be seen feeding in a bush not a yard distant. The Silver-eye is certainly one of the most beautiful little birds on the island, and it is delightful to watch its graceful movements, as, Tit-like, it climbs about among the bushes, examining every bud in search of food.—*W. R. O. G.*

LANIIDÆ.

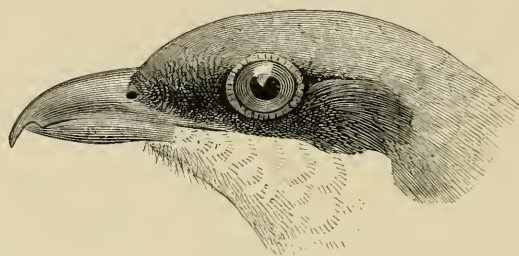
Lanius, Linn.

14. *Lanius uncinatus*, *Scat. & Hartl.*

Lanius uncinatus, *Scat. & Hartl. P.Z.S.*, 1881, p. 168; *Hartl. P.Z.S.*, 1881, p. 954.

The Sokotri name is 'Dehavifi.' 'Tāvifi' (*I. B. Balfour*).

FIG. 3.



HEAD OF *LANIUS UNCINATUS*.

(From the Proceedings of the Zoological Society of London.)

We met with the Sokotran Shrike on all parts of the island visited, and finding it as a rule extremely tame, had no difficulty in obtaining as many specimens as we wanted. It was common among the Date-palm groves and *Acacia* trees round the Hadibu Plain singly or in pairs, and at Homhil we found it abundant, the open grass country with scattered bushes being specially suited to its habits. At Adho Dimellus, our highest camp, at an elevation of 3500 feet, this species was seldom seen, and, in fact, during three weeks spent there I only saw it twice. When we got to Sokotra the breeding season was evidently over, and though on December 16, and many subsequent occasions during our stay, I had opportunities of watching the old birds feeding fully-fledged young, no eggs were obtained.

At Homhil I found a nest in a *Boswellia* tree containing quite young birds, but probably this was an exceptionally late brood, as it was the only nest we found occupied. The general habits do not seem to differ perceptibly from those of the Common Red-backed Shrike. On one occasion our taxidermist, Mr. Cutmore, having shot a Dove (*Turtur senegalensis*), and failed to find it, visited the same place next morning. He found his bird transfixed on an *Acacia* thorn and a Shrike (which he shot) sitting beside it. One curious habit of this bird was its custom of feeding late in the evening. When watching for the little

Scops Owl at dusk, I often saw it busily engaged in catching beetles among the neighbouring bushes. The male has a harsh, rather mournful song, impossible to reproduce, and the usual call-note, frequently uttered from the tops of bushes, sounds like "clink, clink."—*W.R.O.G.*

SYLVIIDÆ.

Cisticola, *Kaup.*

15. *Cisticola incana*, *Scat. & Hartl.*

Cisticola incana, *Scat. & Hartl. P.Z.S.*, 1881, p. 166, pl. xv., fig. 1;
Hartl. P.Z.S., 1881, p. 954.

The Sokotri name is 'Degásagus.'

This small Fan-tailed Warbler was common in almost all bush-clad parts of the island from nearly sea level to an elevation of at least 4500 feet. It was numerous in the neighbourhood of Elhé, on the east of the Hadibu Plain, and equally abundant at Adho Dimellus, in the heart of the Haghier range. Of a noisy, fussy disposition, it may constantly be heard and seen, and is generally easily secured. Its ordinary call-note is a scolding sound, *chip, chip, chip, chip, chip-it, chip-it, chip-it, chip-it*, and it may be exactly reproduced by striking a flint and steel together rather quickly. This may constantly be heard when the birds are moving from bush to bush in search of food, or playing with one another, and to hear it one would imagine that family disputes were everlastingly taking place. The male has a pretty little song, something like that of the Stonechat, and though not very often heard, there could be no doubt about the songster, for I shot a male in the act of singing. On the lower parts of the island, though this species was generally met with in pairs in the end of December and January, the breeding season had hardly commenced. At Jena-*agahan*, on the 7th January, I came across a pair of old birds with three young, just able to fly, but these were apparently an early brood. Towards the end of January a good many birds were seen with nesting materials in their bills, and several of the females shot were evidently about to lay. Many of the pairs near our camp at Adho Dimellus had selected some patch of bush, where they were constantly to be met with, but though we carefully refrained from shooting any of these, and spent many hours searching for their nests, it was not till the 12th of February that I succeeded in finding one. The beautiful dome-shaped structure, with an entrance at the side (Fig. 4), was built of fine grass, ornamented with patches of orange lichen, and placed in a thick bush about three feet from the ground. When found it contained no eggs, and by an unlucky accident the birds belonging to it were shot. When hopping about the bush these birds generally carry the tail in a semi-erect position. They are extraordinarily lively little creatures, constantly chattering and scolding,

FIG. 4.

NEST OF *CISTICOLA INCANA*.

and chasing one another up and down the hillsides. If only winged they are almost always lost, for they run like mice among the thick bush and rocks, and are out of sight in a moment.—*W.R.O.G.*

Iris orange brown, upper mandible dark horn, lower fleshy horn, tarsus flesh horn colour; claws dusky. Total length (measured in the flesh) 4·5 inches.

Professor Balfour found this Warbler "on the higher grassy plains," and he records that its note was a sharp "tit." Dr. Riebeck obtained it on Gebel Fieri.

16. *Cisticola hæsitata* (Sclat. & Hartl.).

Drymeca hæsitata, Sclat. & Hartl. P.Z.S., 1881, p. 166.

The Sokotri name is 'Degásagus.'

This species was only met with on the southern part of the Hadibu Plain, between the Hanefu river and the base of the Haghier range, where the stony ground is almost entirely covered with thick bush-like grass about two feet high, interspersed here and there with larger bushes. The males are most conspicuous in the early morning, when their sharp note



Teet, Teet, Teet, Teet, té té té té té te.

may be heard in different directions. The song, if such it can be called, is wonderfully loud for so small a bird, and generally uttered on the wing, the bird flying along at some height from the ground in a wide segment of a circle with an undulating flight, the notes becoming shorter and quicker as he descends once more to the covert. When the male is singing at the top of a bush, as he sometimes does, he looks just like the Common Wren with an abnormally long tail, which is held over his back in a semi-erect position. The male is much less difficult to obtain than the female, for he not infrequently perches and remains for some moments on the tops of the grass or bushes, but the female spends most of her time busily feeding in the thick of the covert, only momentarily appearing from time to time. These birds, if only winged, are almost impossible to catch, for they run like mice, and disappear directly. They were generally found in pairs, each of which seemed to occupy an acre or two of ground of their own, for when a strange male inadvertently lit within his neighbour's holding he was promptly attacked and chased off by the lawful owner. Adult males have the inside of the mouth bluish black, while in the female this part is flesh-coloured. A young male had the gape flesh-coloured, with a black spot at the base of the tongue. This species did not appear to be breeding, and though I searched carefully for the nest, I never succeeded in finding even an old one.—*W.R.O.G.*

Iris pale straw brown, culmen dusky, cutting edge of upper and lower mandible pale horn; legs and feet flesh colour; claws dusky.

TURDIDÆ.

Saxicola, *Bechst.*

17. *Saxicola isabellina* *Cretzschm.*

Saxicola isabellina, Sclat. & Hartl. P.Z.S., 1881, p. 167.

This large Chat was not obtained by us in Sokotra, but Professor Balfour met with the species in the Feregeh Valley and on the Plain of Nuget, on the south coast of Sokotra.

18. *Saxicola montana*, *Gould.*

Saxicola montana, Sclat. & Hartl. P.Z.S., 1881, p. 167.

The Sokotri name is 'Degiriboop.'

This Chat was numerous on the low open flats near the sea, especially on the Hadibu Plain, but on the higher ground it was rarely met with, only a few being seen on the open grass country round Homhil (1500-2500 feet), and at Adho Dimellus (3500 feet) it was equally scarce. Here again most of the males were in full breeding plumage but no nests were found.

The habits of this species are just like those of the Common Wheatear. When not engaged in searching for small beetles and insects on the ground, they are generally to be seen perched on some low bush or stone, and are not as a rule very timid. The males are constantly playing or sparring with one another, and it is very pretty to see two or more rise into the air and flutter opposite one another with fully extended wings and tail displaying their handsome black and white quills. I shot what was undoubtedly a female at Adho Dimellus in somewhat remarkable plumage, the feathers of the throat being black, narrowly fringed with isabelline brown, and quite similar to those of the male before attaining the full breeding dress.—*W.R.O.G.*

HIRUNDINIDÆ.

Cotile, *Boie.*

19. *Cotile obsoleta*, *Cab.*

Cotile obsoleta, Sharpe, Cat. B. Brit. Mus. x. p. 111 (1885).

The Sokotri name is 'Goab.'

A few pairs of the Pale Rock-Martin were seen about the rocks in different parts of the Haghier range and about the limestone cliffs at Homhil. They were first observed at Jena-aghan hawking insects round a granite peak at an elevation of 1500 feet. I subsequently shot a pair on the top of Homhil at about 2500 feet, and again obtained one of a pair seen at Adho Dimellus, 3500 feet. None of the pairs seen appeared to be nesting.—*W.R.O.G.*

This species had not previously been met with in Sokotra.

CORACIÆ.

CAPRIMULGIDÆ.

Caprimulgus, Linn.20. *Caprimulgus jonesi*, Grant & Forbes. (Plate iv.)

Caprimulgus jonesi, Grant and Forbes, Bull. Liverp. Mus. ii. p. 3 (1899).

Adult Male:—Nearest to *C. nubicus* from Arabia, Palestine, and North-East Africa, but at once distinguished by having the ground colour of the upper parts clear grey instead of sandy brown, and the markings on the top of the head and on the scapulars rufous and buff instead of whitish buff. The whole of the black markings on the upper parts are, moreover, much coarser. Total length (measured in the flesh), 9 inches; culmen, 0·4; wing, 6·1; tail, 4·2; tarsus, 0·75.

The only example of the Sokotran Nightjar was shot in the Dimichiro Valley in the Garieh Plain, East Sokotra. It was found squatting on the ground among the stones close to our rest-camp in the Valley (January 16th, 1899). We never came across the species on any other occasion.—*W.R.O.G.*

We have named this species in honour of Morris P. Jones, Esq., of the Liverpool City Council, and Chairman of the Museums Sub-Committee, who interested himself greatly in the fitting out of the Expedition.

CYPSELIDÆ.

Cypselus, Illiger.21. *Cypselus* (?) *murinus*, Brehm.

Micropus murinus, Hartert, Cat. B. Brit. Mus. xvi., p. 446 (1892).

Several large Swifts, which I have no doubt belonged to this species, passed over our camp on the Hadibu Plain on the evening of the 12th of December. They were flying in wide circles and travelling in a south-easterly direction. When first seen by Dr. Forbes they were close at hand, but by the time I had got a gun from my tent they had gone on their way.—*W.R.O.G.*

UPUPIDÆ.

Upupa, Linn.22. *Upupa* (?) *epops*, Linn.

A species of Hoopoe was seen on the wing both between Sokotra and Abd-el-Kuri, and between the latter island and Aden.—*H.O.F.*

COCCYGES.

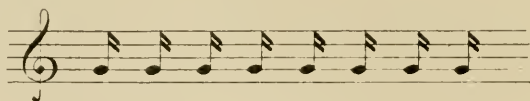
CUCULIDÆ.

Centropus, Illiger.23. *Centropus superciliosus*, Hempr. & Ehr.

Centropus superciliosus, Selat. & Hartl. P.Z.S. 1881, p. 172; Hartl. P.Z.S. 1881, p. 955.

The Sokotri name is 'Mishigiro-giro.'

We first met with this Cuckoo in the thick bush covering the steep slopes of Gebel Raggit, one of the outer hills of the Haghier range. It has two peculiar calls which at once attract attention: a bubbling cry, repeated a dozen or more times in rapid succession, audible at a considerable distance, and a "chucking" note which exactly resembles the sound made by a driver encouraging his horse to trot. The former note is generally a monotone,



Bub, bub, bub, bub, bub, bub, bub, bub.

but occasionally, especially in the early hours of the morning, when these birds are most noisy, one hears variations of the "song," if such it can be called, ascending and descending the scale for about five notes,



Bub,bub,bub,bub,bub, bub,bub,bub,bub, bub,bub,bub,bub, bub,bub,bub,bub.

The second cry, consisting of three long, and six or more short, quickly uttered syllables, cannot be reproduced in writing, but may be easily imitated by putting the tongue against the roof of the mouth and making a sound like *tūk, tūk, tūk, tūk, tūk, tūk, tūk, tūk*.

When we reached Sokotra in the beginning of December, the nesting season was apparently over, for we secured nearly full-grown young birds with the barred wing-coverts denoting immaturity. Though nowhere common, this species was thinly scattered over all parts of the island visited. It was occasionally met with in the Date palm groves bordering the rivers on the Hadibu plain, and in the neighbourhood of Homhil a few examples were obtained, while at Adho Dimellus, our highest camp in the heart of the Haghier range, it was most numerous. Here, in the early morning, a good many birds might be heard "bubbling" on the hill sides. It is always a difficult bird to secure, frequenting the denser parts of the bush-jungle, where it is more often heard than seen. Its nature is somewhat inquisitive, and to ascertain the cause of any unwonted sound it will occasionally mount to the tops of bushes or trees. This is the best chance of shooting it: we found it almost hopeless to secure specimens by following up their cry in the dense bush. If only winged, this cuckoo is almost certain to escape, its long legs enabling it to run almost as fast as a partridge. On the wing its flight resembles that of the Magpie, but is feebler and seldom long

sustained. The birds examined contained grasshoppers and other insect food.—*W.R.O.G.*

STRIGES.

Scops, *Brünn.*

24. *Scops socotranus*, *Grant & Forbes* (Plate v.).

Scops socotranus, Grant & Forbes, Bull. Liverp. Mus. ii. p. 2 (1899).
The Sokotri name is 'Shigidahan.'

Adult male.:—Most nearly allied to *S. gu*, but paler and greyer, the occiput and nape whitish, with fine transverse mottlings of brownish black; primary coverts mostly rufous, forming a rather conspicuous patch; the tips of the primary quills mostly pale rufous, instead of brownish grey; belly white, with very few black arrow-head markings. The feathering on the tarsus less extended, and terminating 0·2 inch from the basal joints of the toes. Iris yellow; bill blackish horn-colour. Total length (measured in the flesh), 7·0 inches; wing, 5·0; tail, 2·2; tarsus, 1·25.

When moving to our second camp at Dahamis we spent a night in the Addah Valley to the east of the Hadibu plain, and it was there that we first heard the cry of this new species, and knew that there was a small Owl to be got. Both at Dahamis and Jena-agahan its peculiar cry, *ku—kurōō*, repeated many times in succession, might be heard every evening, but it was not till we reached the latter place that examples were procured. The rough nature of the ground surrounding these camps, strewn with granite boulders and covered with thick bush and scattered trees, made it impossible to get about at night. Each Owl apparently had its own hunting ground and special trees on which it perched and uttered its cry, for the sounds always came from the same direction. Observing these facts, we attempted unsuccessfully to catch them by setting pole traps, but on the 15th of January a number of natives arrived with two Owls which they had caught among the rocks. These proved to be full-grown young in nearly adult plumage. In his anxiety to see this latest addition to our collection, our interpreter allowed one of the birds to escape from Dr. Forbes's sextant box, in which they had, for want of a cage, been temporarily placed. The whole camp turned out in pursuit, and when we had almost given it up for lost, it was fortunately found, just before dusk, among the scrub, and I shot it.

When we arrived in the open country at Homhil the prospects of obtaining specimens were greatly improved, for one could move about at night without the risk of breaking one's neck. Several of these little Owls were heard about our camp, and we found their castings full of beetle remains under some of the neighbouring *Boswellia* trees. I spent a week in attempting to shoot an individual that frequented a

patch of neighbouring bush. Every evening at dusk and in the early morning I lay in wait for him, but in vain. The first night I had an easy chance of shooting him on a *Boswellia* tree, but having unfortunately taken out a 12-bore, which would have blown him to pieces I resisted the temptation to shoot, thinking another similar chance would occur, but it never did. Having fed largely on beetles in the neighbouring bush, the bird would almost invariably perch on a particular dead branch to crow and digest his food, and the ground beneath was strewn with pellets. He seldom arrived till the light had almost gone, and it was next to impossible to see him. The only cover within shot was a thin bush, and on the slightest movement the *Scops* was gone like a flash before one had time to shoot. Patience was not rewarded. At this time our taxidermist, Mr. Cutmore, had the good fortune to chance on one roosting in a Boxwood (*Buxus Hildebrandti*) thicket, into which he had gone in search of a Fan-tailed Warbler (*Cisticola incana*). He was obliged to shoot it at close quarters, and somewhat damaged it as a specimen, but it proved a valuable addition to our collection, being the one fully adult bird we procured. It is only by the merest chance that this bird is met with during the day time. It no doubt roosts among the rocks or in the thick bush. At night it is very timid and watchful, and is off on the slightest alarm. The food appears to consist almost entirely of beetles, which it captures on the ground.—*W.R.O.G.*

Syrnium, *Savign*

25. *Syrnium*, *sp. incert.*

Though we failed to secure a specimen, there can be no doubt that a large Owl occurs in Sokotra. We first became aware of its presence when camped at Dahamis, on the lower slopes of the Haghier range. From the rocky sides of Dimimi, a hill to the south of our camp, it was heard hooting at night on several occasions. The cry closely resembled that of the common Brown Owl (*S. aluco*). We made careful enquiries among the Sokotri herdsmen in the neighbourhood, and found that the bird was well-known to them, but offers of backsheesh failed to produce a specimen.

On the rocks above Adho Dimellus the bird was actually seen by one of our men, who, accompanied by a Sokotri lad, had gone out in search of wild goats. The bird was so close when first seen that the native struck it with a stone, but failed to kill it, and it disappeared into the thick bush. We naturally asked our man why, when armed with a rifle, he had missed such a golden opportunity, but were told that he was afraid of disturbing the goats! So far as we are aware, this is the one of the few Sokotran species of bird of which no example has been procured.—*W.R.O.G.*

PANDIONES.

Pandion, *Savign.*26. **Pandion haliaetus** (*Linn.*).

Pandion haliaetus, Sharpe, Cat. B. Brit. Mus. i. p. 449 (1874).

A couple of Ospreys were observed off the west end of Sokotra.

ACCIPITRES.

FALCONIDÆ.

Falco, *Linn.*27. **Falco communis**, *Gmel.*

Falco peregrinus, Scat. & Hartl. P.Z.S., 1881, p. 172.

We observed on several occasions a large Falcon which was probably the Common Peregrine, but never had an opportunity of procuring one.

A specimen was collected in the hills above Hadibu by Professor Bayley Balfour.—*W.R.O.G.*

28. **Falco feldeggii**, *Schl.*

Falco feldeggii, Sharpe, Cat. B. Brit. Mus. i. p. 389 (1874).

I saw a pair of Falcons, apparently Lanners, on the slopes of Dimimi, a mountain in the Haghier range to the southward of our camp at Dahamis. They circled round within easy shot, but I had no gun, and was obliged to content myself with watching them. On the following day they were not to be found.

A second pair were seen on the wing in the Dimichiro Valley, but these kept at a safe distance.—*W.R.O.G.*

Cerchneis, *Boie.*29. **Cerchneis tinnunculus** (*Linn.*).

Tinnunculus alaudarius, Scat. & Hartl. P.Z.S., 1881, p. 173.

The Sokotri name is 'Kash-feno.'

We saw a good many pairs of Kestrels about the Hadibu plain, and found them so tame that there was no difficulty in shooting as many as we wanted with the small collecting gun. They were generally to be seen either on the wing or more often perched on a bush, gorged with lizards, locusts, and other smaller grasshoppers, which form their principal food. In other parts of the island visited they were scarce. I once saw one on Homhil at an elevation of about 2500 feet, and there were one or two in the neighbourhood of Adho Dimellus, where a fine male was obtained. This species did not appear to be nesting.—*W.R.O.G.*

In comparing our Sokotran Kestrels in the Liverpool Museums, I find that they agree very closely indeed with two specimens in the Tristram Collection—with one from Teneriffe and one from the Gran Canary.

The latter is the bird described (*Ibis*, 1889, p. 17) by Canon Tristram as darker in colour and smaller than Indian and European examples. In size and colour these Sokotra and Canary Island Kestrels agree exactly.—*H.O.F.*

A specimen was shot by Professor Balfour's expedition on the Shoab Plain.

Buteo, *Cuv.*

30. *Buteo desertorum*, *Daud.*

Buteo desertorum, Sharpe, Cat. B. Brit. Mus. i. p. 179 (1874).
The Sokotri name is 'Nehēme.'

We saw the African Buzzard in all parts of the island visited. On the lower ground they were not very common, though sometimes seen sitting near the top of some high Date-palm or soaring round above the plain, but the greater number were met with in the Haghier range, and about the limestone mountains round Homhil. A good many pairs were nesting, and their young might be heard screaming in the steep and almost inaccessible faces of the rocks. We obtained a pair of young birds from a nest at Homhil, the female being nearly twice as large as the male. The old birds were, generally speaking, wild and difficult to approach, and I only once succeeded in shooting a fully adult bird, but sometimes, as is so often the case when one has no gun, easy chances would occur. This species has not previously been recorded from Sokotra.—*H.R.O.G.*

VULTURIDÆ.

Neophron, *Savign.*

31. *Neophron percnopterus* (*Linn.*).

Neophron percnopterus, Selat. & Hartl. P.Z.S., 1881, p. 172.

The Sokotri name is 'Sau-eido' for one, 'Sau-eid' for a flock of Neophrons.

Egyptian Vultures were very common at all our camps, and so tame and fearless that they would hardly take the trouble to get out of one's way. They would wait outside the tent, where animals and birds were being skinned, ready to pounce on any scraps of flesh thrown out, and squealing and fighting with one another over the bodies. They were so bold that we were often afraid they would come inside the tent and help themselves to more than we intended, but they never did any harm, and were most useful in ridding the camp of all sorts of refuse. The only time when they proved distinctly a nuisance was when I was setting the 'Schuyler' rat-traps. They would wait about, and directly one had gone, try and remove the bait. Sometimes they got caught by the head, but more often they managed to spring the traps and take the meat, a feat which seemed almost impossible. One morning one of the boys brought in a trap in which a Neophron had just been caught by the head. The bird was not quite dead, so

I took it out and laid it on the ground, and in a few minutes it flew away apparently none the worse. A Neophron's neck must be tougher than most, for the fall of this trap is sufficient to smash one's finger to pieces. This species did not appear to be breeding, but we saw many young birds in their dark first plumage, and apparently only a few months old.—*W.R.O.G.*

STEGANOPODES.

PHALACROCORACIDÆ.

Phalacrocorax, *Brisson*.

32. *Phalacrocorax lucidus*, *Licht*.

Phalacrocorax lucidus, Hartl. P.Z.S., 1881, p. 957.

Dr. Hartlaub records an adult female of this species obtained by Riebeck at Tamarida [Hadibu]. Though constantly on the look-out for Cormorants, the only species observed was *P. nigrogularis*, the young of which somewhat resembles *P. lucidus* in having the under parts white. We have been unable to examine Riebeck's bird, but would suggest the possibility that a mistake may have been made in identifying it with the above.

33. *Phalacrocorax nigrogularis*, *Grant & Forbes*. (Plate vi)

Phalacrocorax nigrogularis, Grant & Forbes, Bull. Liverp. Mus. ii. p.3(1899).

A very distinct species belonging to the group with fourteen tail feathers, and with the culmen exceeding 1·5 inch in length from the feathers on the forehead to the tip of the bill.

Adult male (fig. a):—General colour above and below black with a slight gloss, the wing-coverts and scapulars tinged with bronze and with a black spot at the extremity. The throat and hind neck ornamented with minute scattered white plumes, indicating full breeding plumage. Iris dark emerald green; pouch and naked skin in front of and surrounding the eye dirty black; bill greyish black, paler horn-colour towards the tip and on the terminal half of the latericorn; a greenish band along the basal half of the mandible; legs and feet black, webs browner. Total length (measured in the flesh), 30·5 inches; culmen, 3·0; wing, 11·5; tail, 4·3; tarsus, 2·55.

Birds apparently in the second year's plumage (fig. b), have the general colour of the head and upper parts brownish black, the new feathers being ornamented with a black spot at the extremity; the plumage is much mixed with very worn feathers—almost brownish white at the extremity; the chest and rest of the under parts are whitish brown, mottled with pale brown, an effect produced by the worn feathers, which are brown at the base and whitish at the extremity. Iris steel gray; naked skin on gape and in front of eye dull yellow; legs and feet dusky horn; toes and adjacent part of webs blackish. A speci-

men in the first year's plumage (fig. c) has the feathers of the head and upper parts dark brown ; the mantle, wing coverts and scapulars more pointed than in older examples, and with pale whitish margins ; the feathers bordering the naked throat and the chest and rest of the underparts white ; the pale brown bases to the feathers of the breast producing a slightly mottled appearance.

On the 7th December, when the 'Elphinstone' anchored off the west-end of Sokotra, in Gubbat Shoab, below Ras Baduwa, we saw a number of Cormorants swimming in the bay, some being entirely black and different from any we had seen. Captain MacArthur at once ordered the dingy to be got ready, and we started off in pursuit. There was a rough choppy sea in the bay, which made shooting rather difficult, and for some time we were unable to get within shot of any of the birds. At last we neared a pair, and as they rose I dropped them both, but, to my disgust, saw that both heads were still up. Fortune was, however, kind, for they were so bewildered that they forgot to dive, and swam towards one another. As the boat rose again on the crest of a wave, a lucky snap with No. 4 shot settled the business satisfactorily. I was highly pleased to find that these Cormorants, both adult birds in full breeding plumage, belonged to a new species. It was not until our return to Abd-el-Kuri at the end of February that we had an opportunity of obtaining additional specimens. Again aided by Captain MacArthur and his launch, we steamed up to the east-end of the island and met with several small lots of Cormorants coming to their roosting place. On this occasion we each got two immature birds in the brown or second year's plumage. Two adult black birds were also dropped, but neither being quite dead, both were lost among the rocks and surf, where we dared not follow in the launch. In habits this species resembles the rest of its kind, but we found them distinctly wild, and the few we got gave us considerable trouble to collect.—*W. R. O. G.*

SULIDÆ.

Sula, *Brisson*.

34. *Sula piscatrix* (*Linnaeus*).

Sula piscator, Grant, Cat. B. Brit. Mus. xxvi. p. 432 (1898).

On the afternoon of the 7th December, 1898, while we were lying off Haulaf waiting for the arrival of the Sultan from his inland residence, we had the gratification of witnessing close to the ship a splendid spectacle, lasting nearly half an hour. An immense flock of Gannets and Terns (*Sterna bergii*) were preying on a horde of minute fishes, thousands of which were leaping out of the water in broad glittering masses in their hot haste to escape being devoured by a great shoal of mackerel, whose ravenous pursuit of them churned up the sea as if it were agitated by a brisk wind. The Terns as a rule swooped into

the silvery passing cloud and snapped up their victims while in the air. The Gannets, on the other hand, dived down from a great altitude, cleaving the water with a big splash, and disappearing beneath the surface only to presently emerge again, each with its prey in its beak. The whole flock—Gannets and Terns—in following up the rapidly advancing shoal beneath them, were madly wheeling about, ascending and descending in inextricable confusion, all the while screaming in the wildest excitement.—*H.O.F.*

ANSERES.

ANATIDÆ.

Chenalopex, *Steph.*

35. *Chenalopex ægyptiacus* ? (*Linn.*).

Chenalopex ægyptiacus, Salvad., Cat. B. Brit. Mus. xxvii. p. 167 (1895).

On our way down from Homhil to Adho Dimellus, when our far-extended *kufila* (or camel-cade, as one may be allowed to call it) had reached the plain between Matagoti and Hamaderu, which the Goahal stream traverses before joining the Wadi Dimiehiro, a flock of what at first sight appeared, from their general colour, to be Egyptian Vultures (*Neophron percnopterus*), rose in the air, in front of the leading camel, out of the bed of the stream which formed our roadway. Their long necks and manner of flight, however, in a moment showed them to be geese. Their dark backs and wings, in marked contrast to the white or lighter colour of the body and neck, renders it highly probable that the species was the Egyptian Goose. I was riding in the centre of the line, and the guns were far behind, so that it was impossible to secure a specimen. In the air they wheeled several times, rising higher and higher, and then took their flight in a north-easterly direction.—*H.O.F.*

Anas, *Linn.*

36. *Anas boscas*, *Linn.*

Anas boscas, Tristram, Ibis, 1898, p. 248.

Mr. Bennett collected the Mallard in Sokotra; but we did not meet with it.

Chaulelasmus, *G.R.Gr.*

37. *Chaulelasmus streperus* (*Linn.*).

Chaulelasmus streperus, Tristram, Ibis, 1898, p. 248.

The Gadwall was fairly common on the brackish estuaries of the rivers traversing the Hadibu plain—*W R.O.G.*—and in the swamps near Khor Garieh.—*H.O.F.*

Mareca, Steph.**38. Mareca penelope (Linn.).**

Mareca penelope, Salvad. Cat. B. Brit. Mus. xxvii. p. 227 (1895).

We found the Wigeon fairly common about the mouths of the rivers near Hadibu, and met with large flocks in a patch of marshy ground bordering the Dimichiro river, near its entrance into Khor Garieh.

Nettion, Kaup.**39. Nettion crecca (Linn.).**

Querquedula crecca, Sclat. & Hartl. P.Z.S., 1881, p. 173.

We did not meet with the Teal, but it was obtained by Professor Balfour and Mr. Bennett.

Fuligula, Steph.**40. Fuligula nyroca (Güld.).**

Fuligula nyroca, Hartl. P.Z.S., 1881, p. 956.

Nyroca africana, Salvad. Cat. B. Brit. Mus., xxvii. p. 345 (1895).

As we were marching from Ras Haulaf to Hadibu on the morning of our landing on Sokotra, we came on a small flock of Ferruginous Ducks swimming in the brackish estuary of the Wadi Dinehan. They were very tame, and allowed us to approach within a short distance, and did not even then take wing. Having no gun, I obtained no specimen, and never came across the species again. The female recorded by Hartlaub was shot at Kallansiya.—*W.R.O.G.*

PHŒNICOPTERIDÆ.**Phœnicopterus, Linn.****41. Phœnicopterus roseus, Pall.**

Phœnicopterus roseus, Tristram, Ibis 1898, p. 248.

Obtained by Mr. Bennett; but not by us.

Mrs. Bent observes in the Sokotran chapter to her *Southern Arabia* that at Khadoop "there were quantities of Flamingoes on the beach."—*H.O.F.*

PLATALEIDÆ.**Platalea, Linn.****42. Platalea leucorodia, Linn.**

Platalea leucorodia, Sclat. & Hartl. P.Z.S., 1881, p. 173.

Professor Balfour found the Spoonbill on the margins of stagnant pools near the villages on the north coast. We did not meet with it, but no time was devoted to making a collection of the shore birds.

HERODIONES.

ARDEIDÆ.

Lepterodius, Heine & Reichen.43. *Lepterodius gularis*, Bosc.

Ardea gularis, Scat. & Hartl. P.Z.S., 1881, p. 173.

Only the wings of the specimen procured by Professor Bayley Balfour were brought home. The eastern form, *L. asha*, is the species found at Aden, so it may be that a mistake has been made in the identification of the Sokotran bird.

Ardea, Linn.44. *Ardea cinerea*, (Linn.).

Ardea cinerea, Sharpe, Cat. B. Brit. Mus., xxvi. p. 74 (1898).

The Sokotri name is 'Ko-ēta.'

The Heron is fairly common on the rivers and pools near the coast.—*W.R.O.G.*

45. *Ardea purpurea*, Linn.

Ardea purpurea, Hartl. P.Z.S., 1881, p. 956.

The Purple Heron is sometimes met with near the coast. One immature bird was shot near Hadibu.—*W.R.O.G.*

LIMICOLÆ.

CURSORIIDÆ.

Cursorius, Lath.46. *Cursorius gallicus*, Gmel.

Cursorius gallicus, Scat. & Hartl., P.Z.S., 1881, p. 173.

We did not meet with the Cream-coloured Courser. Professor Balfour obtained one out of a lot of three seen near Khadoop on the north coast.

CHARADRIIDÆ.

Arenaria, Briss.47. *Arenaria interpres* (Linn.).

Streptilas interpres, Tristram, Ibis, 1898, p. 248.

Obtained by Mr. Bennett; but not by us.

Ægialitis, Boie.48. *Ægialitis dubia* (Scop.).

Ægialitis curonica, Scat. & Hartl. P.Z.S., 1881, p. 174.

The Sokotri name is 'Degargōri.'

The Little Ringed Dotterel was fairly common on the rivers near the sea and about stagnant patches of water on the Hadibu plain.

49. *Ægialitis alexandrina* (Linn.).

Ægialitis cantiana, Sclat. & Hartl. P.Z.S., 1881, p. 174.

A few Kentish Plover were seen feeding with *Æ. dubia*, and one was procured.—*W.R.O.G.*

Totanus, Bechst.50. *Totanus nebularius* (Gunn).

Totanus canescens, Sclat. & Hartl. P.Z.S., 1881, p. 174.

The Greenshank is common at the mouths of the rivers traversing the Hadibu Plain.

51. *Totanus calidris* (Linn.).

Totanus calidris, Sharpe, Cat. B. Brit. Mus., xxiv. p. 414 (1896).

The Redshank is common on the rivers near Hadibu.—*W.R.O.G.*

52. *Totanus glareola* (Linn.).

Totanus glareola, Hartl. P.Z.S., 1881, p. 956.

The Wood-sandpiper was collected by Riebeck at Kallansiya.

Tringa, Linn.53. *Tringa temminckii* (Leisler).

Limonites temminckii, Sharpe, Cat. B. Brit. Mus., xxiv. p. 555, 1896.

I found a small flock of Temminck's Stints feeding in the bed of the Hanefu river on the 20th February, and shot one to identify the species.—*W.R.O.G.*

Tringoides, Bonap.54. *Tringoides hypoleucus* (Linn.).

Tringoides hypoleucus, Sclat. & Hartl. P.Z.S., 1881, p. 174; Hartl. P.Z.S., 1881, p. 956.

The Sokotri name is 'Diriheutan.'

The Common Sandpiper was fairly numerous on many of the rivers near the sea.

Calidris, Illiger.55. *Calidris arenaria* (Linn.).

Calidris arenaria, Tristram, Ibis 1898, p. 248.

The Sanderling was obtained by Mr. Bennett; but not by us.

Gallinago, Leach.56. *Gallinago gallinago* (Linn.).

Gallinago gallinago, Sclat. & Hartl. P.Z.S., 1881, p. 174.

The Sokotri name is 'Ko-ōito.'

The Common Snipe was fairly common in suitable places. A few were seen on the rivers near the coast, and numbers in a large marshy

patch of ground bordering the Dimichiro River. It was common in the rushy edges of the stream below our camp at Homhil, and proved a welcome addition to our bill of fare.—*W.R.O.G.*

57. *Gallinago stenura*, Bonap.

Gallinago stenura, Sharpe, Cat. B. Brit. Mus., xxiv. p. 619 (1896).

The Sokotri name is 'Ko-ëito.'

Two examples of the Indian Pin-tailed Snipe were shot at Homhil among a number of the common species. I was much surprised at meeting with this bird in Sokotra; and so far as I am aware it has never been procured west of the Indian peninsula.—*W.R.O.G.*

Captain Hunter notes that he observed "on the streams, Snippets, and a bird resembling the **Painted Snipe** of India," *Rostratula capensis*, Linn.—*H.O.F.*

DROMADIDÆ.

Dromas, Payk.

58. *Dromas ardeola*, Payk.

Dromas ardeola, Selat. & Hartl. P.Z.S., 1881, p. 174.

Professor Balfour found the Crab-plover common at Kallansiya at the west end of the island, but we did not come across it.

GAVIÆ.

LARIDÆ.

Sterna, Linn.

59. *Sterna bergii*, Licht.

Sterna bergii, Selat. & Hartl. P.Z.S., 1881, p. 174.

Common along the coasts of Sokotra and Abd-el-Kuri.

Anous, Steph.

60. *Anous stolidus* (Linn.).

Anous stolidus, Saunders, Cat. B. Brit. Mus., xxv. p. 136 (1896).

The Noddy was observed in company with *Sterna bergii*, close to the shore near the foot of Gebel Bitzobur, January 14th, 1899. This bird has not been previously recorded from Sokotra.—*H.O.F.*

Larus, Linn.

61. *Larus affinis*, Reinh.

Larus affinis, Selat. and Hartl. P.Z.S., 1881, p. 174.

Common along the coasts of Sokotra and Abd-el-Kuri.

FULICARIÆ.

RALLIDÆ.

*Porzana, Vieill.*62. *Porzana porzana* (Linn.).*Porzana maruetta*, Tristram, Ibis. 1898, p. 248.

The Spotted Crake was collected by Mr. Bennett, but not by our expedition.

*Gallinula, Briss.*63. *Gallinula chloropus* (Linn.).*Gallinula chloropus*, Hartl. P.Z.S., 1881, p. 957.

Riebeck procured five examples of the Water-Hen, but the exact locality is not stated.

COLUMBÆ.

TRERONIDÆ.

*Vinago, Cuv.*64. *Vinago waalia* (Gmel.).*Treron waalia*, Sclat. & Hartl. P.Z.S., 1881, p. 173; Hartl. P.Z.S., 1881, p. 956.

The Sokotri name is 'Demácha-bírhár.' 'Mahabídat,' (*I.B. Balfour*).

This species was far from common in the parts of the island visited, being thinly scattered over the high ground in small flocks of five or six individuals. The first we saw was shot by one of our men with a rifle in the neighbourhood of Aduna, and too much injured to be worth preserving. We subsequently came across two small flocks during our stay at Homhil, and from the first lot seen in some fig trees below our camp at an elevation of about 1700 feet I shot an immature bird. The second lot were also found feeding in the fig trees just below the limestone caves on Matagoti at about 2500 feet, but a bird shot with the collecting gun was lost among the dense bush and undergrowth. We again saw a small flock in the Dinehan Valley opposite Alilo (1500 feet) on our way to Adho Dimellus, but the birds were very wild, and the flight as usual strong and swift in the extreme.

As there was no particular interest attaching to this well-known African Pigeon, I never took the necessary trouble to obtain more specimens, which would have entailed constantly carrying about a 12-bore gun.—*W.R.O.G.*

PERISTERIDÆ.

*Turtur, Selby.*65. *Turtur senegalensis* (Linn.).*Turtur senegalensis*, Sclat. & Hartl. P.Z.S., 1881, p. 173; Hartl. P.Z.S., 1881, p. 956.

The Sokotri name is 'Digôgo' or 'Digigo.'

Sokotran examples of the Senegal Turtle-Dove have the forehead, chin,

and throat, and sometimes also the lower breast distinctly paler than Arabian examples of this species.

On all parts of the island visited by us, from sea level to an elevation of about 4500 feet, where the bush-jungle ceases, we found this Dove more or less numerous. In the Date palm groves along the rivers running to the north coast it positively swarms, and on the stony bush-clad plains of Hadibu and Garieh it is very abundant, while on the lower and middle slopes of the hills many are met with, their numbers gradually decreasing as the highest parts of the Haghier range are reached. In the neighbourhood of Adho Dimellus, our highest camp, Doves were, comparatively speaking, scarce. They feed almost, if not entirely, on the ground, and are mostly found in pairs or sometimes in small flocks. When flushed they fly up into the nearest bush or tree, whence they "take stock" of the intruder, generally allowing one to approach within a short distance before they again take wing. Many pairs were breeding when we reached Sokotra, and I found a number of nests, each containing two eggs, some quite fresh, others on the point of hatching. Young were also met with in every stage of development, from nestlings to fully fledged birds. The nest, a very slight structure of thin twigs, is generally placed in an *Acacia* or on the branch of a Date-palm, in many instances only a few feet above the ground, but sometimes at a height of at least 20 or 30 feet.

This species is remarkably tame, and often when sitting under a bush pinning out insects, or watching for some small Warbler, a Dove would settle on a branch within a few yards of one, and begin to "coo" or quietly preen its feathers, and with the brilliant sunlight shining on its plumage, it would be difficult to imagine a more pleasing piece of colouring. There was never any difficulty in making a large bag of these birds, but they were hardly worth a shot, for when cooked there is almost nothing to eat on their bones.—*W.R.O.G.*

***Æna*, Selby,**

66. *Æna capensis* (Linn.).

Æna capensis, Hartl. P.Z.S., 1881, p. 956.

Riebeck obtained the Cape Dove at Kallansiya; but it was not seen by us.

***Coturnix*, Moehring.**

67. *Coturnix coturnix* (Linn.).

Coturnix communis, Selat. & Hartl. P.Z.S., 1881, p. 173.

I twice came across the Common Quail in Sokotra, once at Homhil, and once on a grassy plain a few miles to the south. On both occasions I was without a gun, but there could be no doubt about the identity of the species.—*W.R.O.G.*

[Mr. E. N. Bennet mentions **Sand-Grouse** (*Pterocles lichtensteini* ?) among the birds observed by him on Sokotra.—*H.O.F.*]

II.—Birds of Abd-el-Kuri.

PASSERES.

STURNIDÆ.

Amydrus, Cab.

1. *Amydrus creaghi*, *sp.n.*

Adult male :—Allied to *A. blythi*, but at once distinguished by having the crown, throat, and rest of the under parts oil-green (exactly like those of *A. frater*) instead of purplish blue. Total length (tail imperfect) about 12·5 inches ; culmen, 1·25 ; wing, 6·9 ; tail (only the two outer tail feathers present), 5·8* ; tarsus, 1·5.

Adult female :—Resembles the female of *A. blythi*, having the head and neck grey, but no specimen was obtained.

From the first we were rather sceptical about the identity of the Abd-el-Kuri Starling with *A. blythi* from Sokotra, and a careful comparison of the two clearly shows that the former belongs to a different species. A few small flocks frequented the highest parts of the rugged hills bordering the coast, but were so extremely shy that it was only after great exertions that a single specimen was shot. The flocks were composed of about half a dozen individuals, the females being conspicuous by *their grey heads*. The cry closely resembles that of *A. blythi*, but the birds were far wilder, and more difficult to approach.—*W.R.O.G.*

We have named this species in honour of General O'Moore Creagh, V.C., in remembrance of the great kindness and assistance we received at his hands during our stay in Aden.

FRINGILLIDÆ.

Passer, Briss.

2. *Passer hemileucus*, *Grant & Forbes* (Plate vii. fig. i. ♂ and ♀.).

Passer hemileucus, Grant & Forbes, Bull. Liverp. Mus., ii. p. 3, 1899.

Adult male :—Mostly nearly allied to *P. insularis*, but much smaller and very much paler, especially on the under parts, which are nearly pure white. The black patch on the throat is much reduced in size, as in *P. pyrrhonotus*, which species it closely resembles in plumage, but from this latter it may at once be distinguished by the much longer and stouter *black* bill. Iris brown ; bill black ; legs and feet fleshy horn-colour. Total length (measured in the flesh), 5·4 inches ; culmen, 0·45 ; wing, 2·9 ; tail, 2·2 ; tarsus, 0·7.

* Total length probably 6·5.

Adult female :—Most nearly allied to the female of *P. insularis*, but much smaller and very much paler, the under parts being nearly pure white and the dusky patch down the middle of the throat absent. Total length (measured in the flesh), 5·4 inches; culmen, 0·48; wing, 2·8; tail, 2·1; tarsus, 0·7.

This sparrow was certainly one of the most interesting birds met with on Abd-el-Kuri. It was never seen in the neighbourhood of the native village, but appeared to be confined to the bush-clad slopes of one of the highest points, where enormous limestone blocks which have fallen away from the summit lie scattered over the hillside. Here it makes its home, and we found it by no means an easy task to secure specimens, for they are very shy and not very numerous. The extremely rough nature of the ground makes progress very slow, and consequently it was by no means easy to follow up the note quickly. During our first visit to the island, Dr. Forbes and I each obtained a male, and on our return I secured a pair, the only ones seen during a whole day.—*W.R.O.G.* A small flock, however, kept flitting about near me on the stems of the bizarre Milk-bushes (*Euphorbia Abdelkuri*) growing about the middle of the mountain, while I was engaged in digging up the fine specimen of this new plant, which eventually reached home alive—*H.O.F.*

SYLVIIDÆ.

Sylvia, Scop.

3. *Sylvia cinerea*, Bechst.

Sylvia cinerea, Seebohm, Cat. B. Brit. Mus. v. p. 8 (1881).

A female Whitethroat was shot by Mr. Cutmore on the 4th December among the stunted bushes on the central plain.

Phylloscopus, Boie.

4. *Phylloscopus rufus* (Bechst.).

Phylloscopus rufus, Seebohm, Cat. B. Brit. Mus. v. p. 60 (1881).

On our second visit to Abd-el-Kuri I secured a solitary example of the Chiff-chaff, which was feeding amongst the bushes near the top of the highest point in the island.—*W.R.O.G.*

TURDIDÆ.

Saxicola, Bechst.

5. *Saxicola isabellina*, Cretschm.

Saxicola isabellina, Sclat. & Hartl. P.Z.S., 1881, p. 167.

A male of this Chat was shot on the 23rd February.

6. *Saxicola montana*, Gould.

Saxicola montana, Sclat. & Hartl., P.Z.S. 1881, p. 167.

This handsome Chat was the commonest species met with on Abd-el-Kuri. It was abundant on the low stony plain between the hills, the only

vegetation consisting of dwarfed shrubs scattered here and there over the barren ground. Some birds were also met with on the higher ground at an elevation of nearly 1700 feet, where many curious and interesting bushes and plants grow in considerable luxuriance among enormous blocks of limestone, which have fallen from the crest of the hill above. Though many of the males were in full breeding dress, with jet black throats, none appeared to be nesting, and the ovaries of such females as we examined were undeveloped, but our stay on the island was so short that, common as the bird was, nests might easily have been overlooked.—*W.R.O.G.*

ALAUDIDÆ.

Pyrrhulauda, *Smith*.

7. *Pyrrhulauda melanauchen*, *Cab.*

(See the notes on this species on p. 33.)

MOTACILLIDÆ.

Anthus, *Bechst.*

8. *Anthus campestris* (*Linn*).

Anthus campestris, Sharpe, Cat. B. Brit. Mus., x. p. 569 (1885).

This species was only met with on Abd-el-Kuri, where a pair were seen during our second visit to the island on the 23rd February. They were extremely wary, but after some trouble the male was secured.—*W.R.O.G.*

Motacilla, *Linn.*

9. *Motacilla forwoodi*, *Grant & Forbes*. (Plate vii. fig. 2.)

Motacilla forwoodi, Grant & Forbes, Bull. Liverp. Mus., ii. p. 3, 1899.

Adult female in winter plumage:—Most nearly allied to *M. alba* in full summer plumage, the top of the head and the entire chin, throat, and foreneck being deep black, but the forehead is *dark grey* like the back and rest of the upper parts, instead of pure white. Iris dark brown; bill and legs black. Total length, 7 inches; culmen, 0·45; wing, 3·3; tail, 3·4; tarsus, 0·85.

Forwood's Wagtail was only met with on the island of Abd-el-Kuri, where it was common enough on the stony plain outside the native village. Unfortunately we did not at the time distinguish it from *M. alba*, and only secured two examples, an adult and an immature female.—*W.R.O.G.*

We have named this species in honour of Sir William B. Forwood, Chairman of the Library and Museums Committee of the Liverpool Corporation, who in the City Council warmly supported the proposal that the Municipal Museum should co-operate with the British Museum in exploring the Natural History of Sokotra.

UPUPÆ.

UPUPIDÆ.

Upupa, *Linn.*10. *Upupa* ? *epops*, *Linn.*

(See the note on this species on p. 43.)

CORACIÆ.

CORACIIDÆ.

Coracias, *Linn.*11. *Coracias* ? *abyssinicus*, *Bodd.*

Coracias abyssinicus, Sharpe, Cat. B. Brit. Mus., xvii. p. 19 (1892).

I picked up on Abd-el-Kuri a skeleton of a *Coracias*, of which I brought away the skull, which, on comparing it with a specimen in the British Museum, agreed exactly with this species.

The members of this genus which occur in Somaliland, however, belong to the species *C. lorti*, Shelley, and *C. navius*, Daud.—*H.O.F.*

ACCIPITRES.

PANDIONES.

Pandion, *Savig.*12. *Pandion haliaetus*, *Linn.*

Pandion haliaetus, Sharpe, Cat. B. Brit. Mus., i. p. 449 (1874).

A good many Ospreys frequented the east end of Abd-el-Kuri, where a pair of very old birds was shot.

FALCONIDÆ.

Falco, *Linn.*13. *Falco* ? *barbarus*, *Linn.*

Falco barbarus, Sharpe, Cat. B. Brit. Mus. i. p. 386 (1874).

A small Falcon, which there is little doubt belonged to this species, was seen.—*W.P.O.G.*

STEGANOPODES.

PHALACROCORACIDÆ.

Phalacrocorax, *Brisson.*14. *Phalacrocorax nigrogularis*, *Grunt & Forbes.* (See p. 49 and Plate vi.)

The Black-throated Cormorant was seen in considerable numbers near our anchorage at Bander Saleh, and a quite young male specimen

was, on the morning of the 2nd December, 1898, shot by Captain MacArthur as it was flying over the 'Elphinstone' when in the Gulf of Aden, in $49^{\circ} 30'$ E. long., and $12^{\circ} 20'$ N. lat., or about 100 miles W. of Cape Guardafui, and about 150 from Abd-el-Kuri.—*H.O.F.*

SULIDÆ.

Sula, *Brisson*.

15. *Sula piscatrix* (*Linn.*).

Sula piscator, Grant, Cat. B. Brit. Mus., xxvi. p. 432 (1898).

I observed a small flock of the White Booby in one of the baylets to the west of our anchorage in Bander Saleh, February 23, 1899. Gannets abound, according to Captain Haines, in the serrated islets, known as Kahl Far'um, that lie in view from Abd-el-Kuri, a short way off the north coast. These rocks glisten white in the sun from being covered with the excrement of the birds that breed there.—*H.O.F.*

16. *Sula sula* (*Linn.*).

Sula sula, Grant, Cat. B. Brit. Mus., xxvi. p. 436 (1898).

I shot a couple of the Common Booby from a small flock near the east end of Abd-el-Kuri. On lifting them into the launch several specimens of a curious parasitic fly (*Olfersia* ? *spinifera*) were immediately observed to leave their bodies and fly overboard. Two were, however, secured by tying up the dead birds in a cushion-cover, and afterwards chloroforming the bundle in a zinc-lined box.—*W.R.O.G.*

LIMICOLÆ.

CHARADRIIDÆ.

Ægialitis, *Boie*.

17. *Ægialitis* ? *dubia* (*Scop.*).

Seen but not obtained.

Tringoides, *Bonap.*

18. *Tringoides* ? *hypoleucus* (*Linn.*).

Seen but not obtained.

GAVIÆ.

LARIDÆ.

Sterna *Linn.*

19. *Sterna bergii*, *Licht.*

Common along the coast.

Larus *Linn*

20. *Larus affinis*, *Reinh.*

Common along the coast.

21. *Larus fuscus*, Linn.

Larus fuscus, Saunders, Cat. B. Brit. Mus. xxv. p. 250 (1896).

The Lesser Black-backed Gull was observed along with *Sula piscatrix* in one of the baylets to the west of our anchorage in the Bander Saleh, February 23, 1899.—*H.O.F.*

Coturnix*, Moehring.*22. *Coturnix coturnix* (Linn.).**

Only one example was seen on a small grassy plateau near the top of the mountain overlooking our anchorage. I ought to have secured it with the .410 gun, but failed. There could be no doubt about the identity of this species.—*W.R.O.G.*

As the above lists show, the avifauna of the little Archipelago, of which Sokotra is the largest island, comprises, so far as ascertained, 77 species, of which 15 are endemic, 11 species being confined to Sokotra and 3 to Abd-el-Kuri. The Black-throated Cormorant (*P. nigrogularis*), which is common to both islands, although first described from our collections as new, will, as might be expected, most likely prove to be a more widely distributed species already known but unnamed, as Mr. Grant has suggested in a recent number of *Noritates Zoologicae* (vii. p. 264, 1900). I am inclined to agree with his opinion that the "*Phalacrocorax*, sp. incert.," recorded by Colonel Yerbury and the late Lieutenant Barnes from Aden, will turn out to be conspecific with the Sokotran form.

The total bird-fauna of Sokotra comprises 67 species, and of Abd-el-Kuri 22 species. Kahl Far'un is frequented by large numbers of sea-fowl; but of the birds inhabiting Saboynea and the remaining two members of The Brothers group (Samneh and Darzi) nothing is yet known.—*H.O.F.*

PLATE III.

Fig. 1. FRINGILLARIA SOCOTRANA, *Grant & Forbes*, p. 32.

Fig. 2. FRINGILLARIA INSULARIS, *Grant & Forbes*, p. 29



1



2

1 FRINGILLARIA SOCOTRANA. 2 F. INSULARIS.

PLATE IV.

CAPRIMULGUS JONESI, *Grant & Forbes*, p. 43.



CAPRIMULGUS JONESI

PLATE V.

SCOPS SOCOTRANUS, *Grant & Forbes*, p. 45.



SCOPS SOCOTRANUS.

PLATE VI.

PHALACROCORAX NIGROGULARIS, *Grant & Forbes*, p. 49.

Fig. a. *Adult Male.*

Fig. b. *Bird in Second Year's Plumage (probably).*

Fig. c. *Bird in First Year's Plumage.*

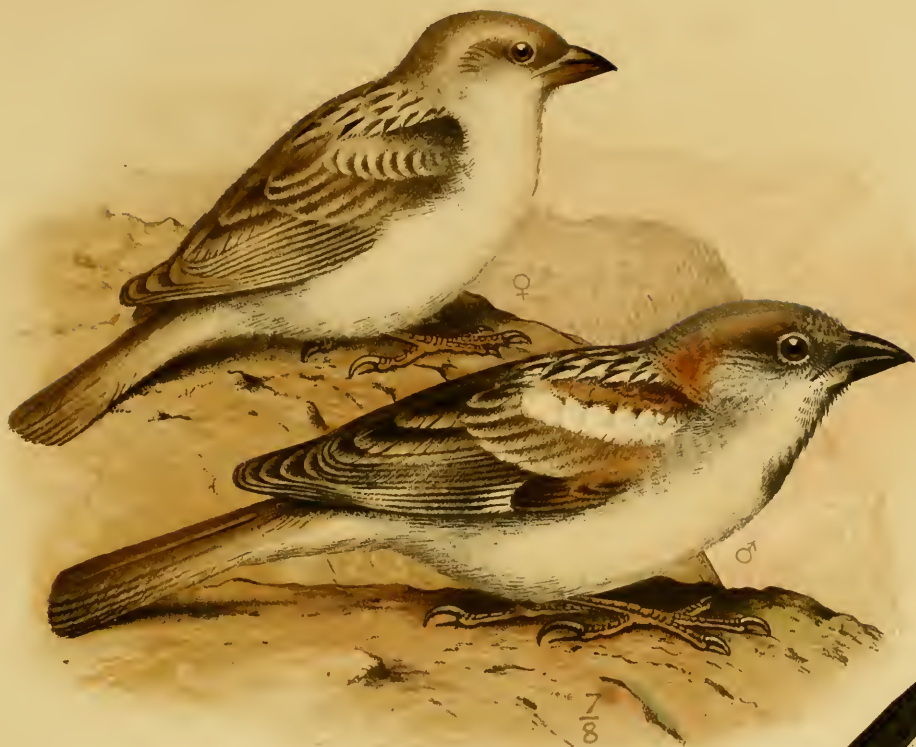


PHALACROCORAX NIGROGULARIS.

PLATE VII.

Fig. 1. PASSER HEMILEUCUS, *Grant & Forbes*, p. 58.

Fig. 2. MOTACILLA FORWOODI, *Grant & Forbes*, p. 60.



1



2

1 PASSER HEMILEUCUS. 2 MOTACILLA FORWOODI.

CHORDATA.
VERTEBRATA.

Reptilia.

By G. A. BOULENGER, F.R.S.

PLATES VIII., IX., X., XI.

Reptiles.

The collection of Reptiles brought home by Mr. Ogilvie-Grant and Dr. H. O. Forbes usefully supplements those previously made by Professor I. B. Balfour and Dr. Riebeck, the former of which was reported upon by Drs. Günther and Blanford, the latter by the late Professor Peters. It shows that the field was still far from being exhausted, when six species, one of which proves to be referable to a new genus, could be described as new.

The present account is divided into two chapters, the first dealing with Sokotra, the second with Abd-el-Kuri, a small island between Cape Guardafui and Sokotra, the fauna of which had not previously been explored.

The vicinity of Sokotra to both Somaliland and Southern Arabia would, *à priori*, imply a close affinity with the faunas of both these countries, so similar to each other. This, however, is not the case, and although the Sokotran reptiles show, of course, an entirely Africo-Arabian general character, it is surprising to find the great majority of the species, and as many as three genera out of thirteen, to be endemic. This, together with the absence of many a species common to both neighbouring coasts (*Pristurus crucifer*, *P. flavipunctatus*, *Acanthodactylus boskianus*, *Chalcides ocellatus*, *Zamenis rhodorhachis*, &c.), which cannot be accounted for by the physical conditions of the island, clearly proves Sokotra to have been isolated for a very long period.

The complete absence, so far as we know, of Batrachians is another remarkable feature which this island shares with many others.

On Abd-el-Kuri, besides marine Chelonians, only three species—Geckos—were discovered; two of these belong to undescribed species, whilst the third is common to Sokotra and Arabia.

I.—The Reptiles of Sokotra.

SQUAMATA.

LACERTILIA

GECKONIDÆ.

Pristurus, Rüpp.

1. *Pristurus insignis*, Blanford.

Pristurus insignis, Blanford, Proc. Zool. Soc., 1881, p. 466, pl. xlii. fig. 1

Bouleng. Cat. Liz. i. p. 53 (1885).

Habit slender, very similar to that of the Iguanoid lizards of the genus

Anolis. Head short and deep; snout subacuminate, longer than the distance between the eye and the ear-opening, once and one third to once and a half the diameter of the orbit; forehead feebly concave; ear-opening large, oval, vertical, one third to nearly one half the diameter of the orbit. Limbs very long, the hind limb when stretched forwards reaching between the ear and the eye; digits very long and slender; 25 to 28 lamellæ under the fourth toe. Snout covered with large granules or polygonal convex scales; the remaining portion of the head, as well as the upper parts of the body, limbs, and tail, covered with minute granules. Rostral subquadrangular, at least twice as broad as deep, with median cleft above; nostril pierced between the rostral and two to four scales; 6 to 9 upper and 5 or 6 lower labials; symphysial extremely large, rounded or truncate behind and in contact with 3 to 5 small chin-shields. Ventral scales granular, a little larger than the dorsals. Tail much longer than head and body, slender, more or less strongly compressed and keeled above, but without even the slightest rudiment of a crest. Grey or brown above, with darker and lighter spots, and usually with more or less distinct dark bars across the back and tail; small brick-red spots or dots, or vermicular lines on the sides; belly bright yellow; throat white or bluish, mottled or marbled with grey or brown, these marblings sometimes extending on to the breast.

	♂	♀
Total length	160 millim.	124 millim.
Head	15 "	14 "
Width of head	10 "	8 "
Body	43 "	38 "
Fore limb	31 "	26 "
Hind limb	41 "	35 "
Tail.....	102 "	72 "

This fine species, one of the largest of the genus, was discovered by Prof. Balfour, but only two specimens were procured by him, from which Dr. Blanford drew up his excellent description. The above description, on the contrary, is based on a large number of examples obtained by Mr. Grant and Dr. Forbes at Jena-agahan, Homhil, and Adho Dimellus.

2. *Pristurus rupestris*, Blanford.

Pristurus rupestris, Blanf., Ann. & Mag. N. H. (4) xiii., 1874, p. 454; Zool. E. Pers. p. 350, pl. xxiii. fig. 1, and Proc. Zool. Soc., 1881, p. 465; Murray, Zool. Sind, p. 365, pl. —, fig. 1 (1884); Bouleng., Cat. Liz. i. p. 53 (1885), and Faun. Ind., Rept. p. 72 (1890); Anders. Herp. Arab. p. 23 (1895).

Habit not quite so slender as in the preceding species. Head longer, more depressed; snout more or less acuminate, once and two fifths to once and a half the diameter of the orbit; forehead scarcely concave; ear-opening roundish or oval and oblique, one fourth to one third the

diameter of the orbit. Limbs long, the hind limb when stretched forwards reaching the ear or between the shoulder and the ear; digits long and slender; 23 to 26 lamellæ under the fourth toe. Snout covered with rather large polygonal convex scales, the remainder of the head, the body, and the limbs with very small granules; the granules on the belly longer than those on the back, but smaller than the scales on the snout. Rostral at least twice as broad as deep, with median cleft above; nostril pierced between the rostral and two or three scales; 6 to 8 upper and 4 to 6 lower labials; symphysial very large, very variable in shape, rounded or truncate behind, with straight, convex, or concave sides, its posterior border in contact with 2 to 5 scales. Tail longer than head and body, slender, compressed, keeled above and beneath; in adult males with intact tails, both keels denticulate, the upper even forming a veritable crest, which, however, never extends to the body; in females, as well as in some males in which the tail has been regenerated, the crest is very feeble. Coloration extremely variable; upper parts greyish, brownish, or reddish, with lighter and darker markings; the light markings usually in the form of small round spots, the dark ones disposed as transverse spots, longitudinal stripes, or in elegant network; a dark streak on the side of the head, passing through the eye, is constantly present; a yellow or orange vertebral stripe, which is absent or but feebly marked in the Arabian and Abd-el-Kuri specimens, is usually sharply defined; a whitish lateral streak is frequently present, extending from the upper lip to above the hind limb. Lower parts white, gular region often spotted or reticulated with blackish; brick-red dots sometimes present on the belly and sides.

	♂		♀
Total length	98	millim.	79 millim.
Head	12	„	10 „
Width of head	7	„	6 „
Body	28	„	24 „
Fore limb	18	„	15 „
Hind limb	26	„	20 „
Tail	58	„	45 „

This little Gecko has a rather wide distribution, being known from the island of Karraek, near Bushire, in the Persian Gulf, from Muscat and the Hadramaut in Arabia, and from Sokotra. J. A. Murray also records it from Sind. On Sokotra it occurs everywhere in great abundance, and numerous specimens were collected on Hadibu Plain at Dahamis, Jena-agaban, Hombil, and Adho Dimellus, thus from sea level to an altitude of 4500 feet. The colour variations to which I have alluded above are in no way dependent on the localities. The specimens brought home by Professor Balfour were likewise very variable in this respect.

Dr. Anderson, whose death, as these pages are passing through the press, is so great a loss to zoological science, has pointed out that the lizards from Sokotra (and, I may add, from Abd-el-Kuri) have the snout longer and more pointed than the types. This is, however, not absolutely constant, as the series before me now shows, and I therefore do not think anything would be gained, in the way of taxonomic accuracy, by raising the Sokotran specimens to the rank of a sub-species. The name of the species, coupled with an indication of the locality, is amply sufficient for all purposes.

[The habits of both *Pristurus insignis* and *P. rupestris* are so similar that the same remarks apply to both. They were generally found among the larger rocks on the hill sides or on the large boulders in the dry beds of water-courses, and seemed especially fond of the cracks and fissures in the perpendicular faces of the cliffs where they might frequently be seen sunning themselves. Extremely swift in their movements and constantly on the alert for danger, they were much the most difficult lizards to catch without injury. If pounced on with the hand, one was almost invariably too late, and only a struggling tail remained, the rest of the Gecko disappearing like a flash into some neighbouring crack. Far the best mode of capture is to shoot them with a saloon pistol and a few pellets of dust shot, or, at close quarters, sand may be used with excellent results. By this means eight perfect specimens were collected one morning at Adho Dimellus in a very short time, three being killed at one shot.—H.R.O.G.]

Phyllodactylus, Gray.

3. *Phyllodactylus riebeckii*, (Peters). (Plate viii.).

Diplodactylus riebeckii, Peters, Sitzb. Ges. naturf. Freunde Berl., 1882, p. 43.

Phyllodactylus riebeckii, Bouleng., Cat. Liz. i., p. 94 (1885).

Head large, with strongly swollen cheeks; snout short, not or but slightly longer than the orbit, rounded; forehead deeply concave; ear-opening oval, oblique, its greatest diameter about half that of the eye; its distance from the latter equal to the length of the snout. Limbs strong; digits rather short, depressed, with large subtriangular distal expansions and a regular series of lamellæ under the non-dilated portion; 5 or 6 lamellæ under the inner digit, 7 or 8 under the fourth. Scales on the head finely granular, more coarsely on the snout at the sides of the frontal concavity; rostral twice as broad as deep, without median cleft; nostril in the centre of a slight swelling, bordered by the rostral, the first upper labial, and three nasals; the inner nasals separated from each other, above the rostral, by one or two small scales; 10 to 12 upper and 9 to 11 lower labials; symphysial pentagonal, a little larger than the adjacent labials; a regular series of 6 or 8 chin-shields, the median pair as long as the symphysial, with which

they are in contact. Body covered, above and below, with uniform, flat, smooth, juxtaposed granules, as large as or a little larger than the larger granules on the snout. Tail cylindrical, tapering to an obtuse point, slightly prehensile, covered with uniform flat granules arranged in rings. Grey-brown above, with small dark brown markings usually disposed in pairs or forming narrow cross-bars on the back; roundish white spots, which form regular cross-bars in the young, are sometimes preserved in the adult; a dark streak from behind the eye to above the ear; intact tail with pale cross-bars, reproduced tail streaked with dark brown; lower parts white, throat sometimes spotted with brown.

Total length.....	255 millim.	Fore limb	48 millim.
Head.....	34 ,,	Hind limb.....	67 ,,
Width of head...	28 ,,	Tail	130 ,,
Body	91 ,,		

This species, the largest known in the genus *Phyllodactylus*, was discovered in Sokotra by Dr. E. Riebeck. Several specimens were obtained by Mr. Grant and Dr. Forbes at Homhil and Adho Dimellus.

[Most of the specimens brought home were captured in holes in the partially decayed stems of large trees (mostly *Boswellia*). One individual was found under a large stone in the bed of the river to the south of Adho Dimellus. These large Geckos are very muscular and extremely tenacious of life. When placed in the strongest Spirit of Wine they continued to struggle violently for fully a quarter of an hour, and it was painful to watch their efforts to escape. The species was only met with between about 2000 and 4000 feet.—*W.R.O.G.*]

4. *Phyllodactylus trachyrhinus*, Bouleng. (Plate ix. fig. 1).

Phyllodactylus trachyrhinus, Bouleng., Bull. Liverp. Mus., ii., 1899, p. 4.

Snout short, broadly rounded, covered with large sub-conical tubercles adherent to the skull; forehead convex; ear-opening small, round, its distance from the eye equal to the length of the snout. Limbs rather short; digits short, depressed, with well developed distal expansions, and a series of transversely enlarged lamellar scales on the lower surface. Scales on the head much larger than on the body, gradually decreasing in size on the occiput; rostral completely divided into two shields, which are not larger than the adjacent labials; nostril between the first labial and two small nasals; 8 to 10 upper and 9 lower labials; symphysial small, trapezoid, not larger than the adjacent labials; a series of small shields bordering the symphysial and the anterior lower labials. Body covered, above and below, with uniform, flat, smooth, juxtaposed granules, smallest on the sides. Tail thick, cylindrical, prehensile, covered with uniform flat granules arranged in rings. Pale brownish above, with blackish marblings; a black streak on each side of the head, passing through the eye; white beneath.

Total length	95 millim.	Fore limb	13 millim.
Head	13 „	Hind limb.....	18 „
Width of head ...	9 „	Tail	40 „
Body	32 „		

Described from two specimens from Jena-agahan (1200-2500 ft.) and Adho Dimellus (3500-4500 ft.).

Hemidactylus, Cuv.

5. *Hemidactylus homœolepis*, *Blanford*.

Hemidactylus (Liurus) homœolepis, Blanf., Proc. Zool. Soc., 1881, p. 464, pl. xlii. fig. 2.

Hemidactylus homœolepis, Bouleng., Cat. Liz. i., p. 117 (1885).

Snout obtusely pointed, longer than the distance between the eye and the ear-opening, once and one-third the diameter of the orbit; forehead scarcely concave; ear-opening small, oval, oblique. Body and limbs moderate. Digits moderately dilated, free, with rather short distal joints; 5 or 6 lamellæ under the thumb, 7 or 8 under the fourth finger, 4 or 5 under the hallux, 8 or 10 under the fourth toe. Head covered with small convex granules, largest on the snout; rostral not twice as broad as deep, with median cleft above; nostril pierced between the rostral, the first upper labial, and 5 nasals; 8 or 9 upper and 7 or 8 lower labials; symphysial large, triangular, more than twice as long as the adjacent labials; four chin-shields, median pair largest and in contact behind the symphysial. Back covered with flat, subimbricate, smooth, round scales, largest on the sides; ventral scales small, imbricate, scarcely larger than the dorsals. Male with 4 præanal pores. Tail cylindrical, tapering, covered above with uniform, small, smooth, subimbricate, flat scales, beneath with a median series of transversely dilated plates, commencing some distance behind the vent. Grey or fawn above, spotted with brown; a dark streak on the side of the head, passing through the eye; tail with blackish annuli; lower parts white.

Total length	77 millim.	Fore limb.....	10·5 millim.
Head	10 „	Hind limb	13·5 „
Width of head ...	6 „	Tail.....	40 „
Body	27 „		

This small Gecko, discovered in Sokotra by Professor Balfour, has been obtained on Hadibu Plain, at Dahamis, Jena-agahan, Homhil, and Adho Dimellus by Messrs. Grant and Forbes. In giving an account of the Reptiles collected by Dr. Riebeck, the late Professor Peters, (i.e., p. 43), adds some remarks on *H. homœolepis*, which tend to show that he has confounded *H. flaviviridis* (= *coctei*) with this species. Professor Bettger's *H. homœolepis* (*Zool. Anz.*, 1893, p. 114) from Somaliland is a distinct, though closely allied species, which I have

described as *H. isolepis* (*Proc. Zool. Soc.*, 1895, p. 531, pl. xxix., fig. 1).

[Fairly common, found under rocks and stones generally in the dry beds of the streams.—*W.R.O.G.*]

6. *Hemidactylus pumilio*, *nom. nov.* (Plate x. fig. 1).

Hemidactylus pumilus (non Hallow.), Bouleng., Bull. Liverp. Muss., ii., 1899, p. 6.*

Head elongate, nearly twice as long as broad; snout rounded, longer than the distance between the eye and the ear-opening, once and a half the diameter of the orbit; forehead slightly concave; ear-opening small, oval. Body and limbs moderate. Digits short, free, with very short distal joint, moderately dilated; inner digit with sessile claw; 4 lamellæ under the inner digit, 6 under the fourth finger, 7 or 8 under the fourth toe. Head covered with uniform granules, which are larger on the snout; rostral tetragonal, nearly twice as broad as deep, with median cleft above; nostril pierced between the rostral and 4 small scales; 8 or 9 upper and 6 to 8 lower labials; symphysial triangular, twice as long as the adjacent labials; 4 chin-shields, inner pair largest and forming a suture behind the symphysial. Body covered above with fine granules intermixed with small round or oval feebly keeled tubercles disposed irregularly. Ventral scales small, cycloid, imbricate, smooth. Male with an angular series of 5 or 6 preanal pores. Tail cylindrical, tapering, covered with small flat scales, above with transverse series of pointed tubercles; no transversely enlarged scales below. Pale brown or buff above, with or without small brown spots; a dark brown streak on each side of the head, passing through the eye; white beneath.

Total length	53 millim.	Fore limb	7 millim.
Head	8 „	Hind limb.....	11 „
Width of head ...	4.5 „	Tail.....	27 „
Body	18 „		

Several specimens from Dahamis (350 ft.) and Jena-agahan (1200-2500 ft.).

[This little Gecko was only met with on the lower and middle slopes of the Haghier range. The specimens collected were all found under the boulders and stones in or near the dry beds of streams.—*W.R.O.G.*]

7. *Hemidactylus granti*, Bouleng. (Plate x. fig. 3).

Hemidactylus granti, Bouleng., Bull. Liverp. Muss., ii., 1899, p. 4.

Closely allied to *H. mabuia*, Mor. Head regularly oviform; snout longer than the distance between the eye and the ear-opening, once and a half the diameter of the orbit; forehead concave; ear-opening

* In describing this species I overlooked *H. pumilus*, Hallowell, 1860, a probable synonym of *H. frenatus*, D. & B. I have therefore changed the name to *H. pumilio*.

large, oval, oblique. Body and limbs moderate. Digits moderately dilated, free; 7 or 8 lamellæ under the thumb, 8 or 9 under the fourth finger, 6 or 7 under the hallux, 9 to 11 under the fourth toe. Head covered with uniform granules, which are much larger on the snout than on the occiput; rostral subquadrangular, not twice as broad as deep, with median cleft above; nostril pierced between the rostral, the first upper labial, and three small scales; 8 to 10 upper and 7 to 9 lower labials; symphysial large, triangular or pentagonal, twice as long as the adjacent labials; four chin-shields, median pair largest and in contact with the symphysial. Back covered with very small granules intermixed with numerous small, round, feebly keeled or subconical tubercles disposed irregularly; ventral scales small, cycloid, smooth, feebly imbricate. Male with an angular series of 8 to 12 preanal pores. Tail feebly depressed, tapering to a fine point, covered with granular scales intermixed with enlarged pointed tubercles forming regular transverse series; a series of transversely enlarged plates inferiorly. Greyish or brownish above, with dark irregular marblings or dark black-edged wavy cross-bars, 4 in number, on the nape and back; a dark streak on each side of the head, passing through the eye; tail with regular dark cross-bars; lower parts whitish.

Total length.....	172 millim.	Fore limb.....	26 millim.
Head.....	22 „	Hind limb.....	33 „
Width of head...	16 „	Tail	94 „
Body.....	56 „		

Numerous specimens from Adho Dimellus, Sokotra (3500-4500 ft.).

[Common on the high ground round Adho Dimellus, the highest pass in the central Haghier range; found below stones on the hill sides.—*W.R.O.G.*]

8. *Hemidactylus turcicus*, Linn.

Hemidactylus turcicus, Bouleng., Cat. Liz. i., p. 126 (1885).

This widely-distributed Gecko, the range of which extends from the borders of the Mediterranean to N. W. India, has not been recorded from Sokotra before. Specimens were obtained on Hadibu Plain and at Homhil.

9. *Hemidactylus flaviviridis*, Rüpp.

Hemidactylus coctari, Dum. & Bibr. iii., p. 365 (1836).

Hemidactylus homeolepis, Peters, Sitzb. Ges. naturf. Freunde, Berl., 1882, p. 43.

Another widely-distributed Gecko, ranging from the borders of the Red Sea to the Malay Peninsula. It was first obtained in Sokotra by Dr. Riebeck, but the specimen brought home by him was recorded under *H. homeolepis*. Mr. Grant and Dr. Forbes collected a single specimen on Hadibu Plain. The British Museum possesses specimens from Suez,

Suakin, Aden, Muscat, Hadramaut, Fao (Persian Gulf), Jask (Persia), Benares, Patna, Ellore, Bombay, Calcutta, Penang.

The family *Agamidae* appears to be unrepresented in Sokotra. I strongly suspect *Uromastix ocellatus* mentioned by Peters (*Op. cit.*, p. 45) to have been obtained in Arabia by Dr. Riebeck on his way to Sokotra, together with the *Chamaeleon calyptratus*, Peters *nec* A. Dum. (= *C. calcarifer*), recorded by the same author (p. 43).

[VARANIDÆ.

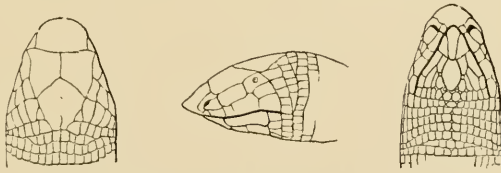
Although we neither saw nor heard of the presence of Monitors in Sokotra, yet the observation by the author of *The Periplus of the Erythrean Sea* that the island of Dioscorides had . . . "lizards of enormous size, of which the flesh serves for food, while the grease is melted down and used as a substitute for oil," can hardly apply to any other than a species of *Varanus*. I have seen the Malayan Monitors applied by the natives to both the uses here stated. A widespread belief exists in the efficacy of their fat when rubbed over the body as a curative remedy in all sorts of illness. The species would probably be either the *Varanus griseus* (Daud.), which is distributed over Northern Africa, South-West Asia, from Arabia to the Caspian Sea and North-West India, or *V. niloticus* (Linn.). Its extinction in Sokotra may be due to the fact of its being used as food and medicine in an island where both are scarce.—*H.O.F.*]

AMPHISBÆNIDÆ.

Pachycalamus, Günth.

Pachycalamus, Günth., Proc. Zool. Soc., 1881, p. 461 (figs. in text); Peters, Sitzb. Berl. Ac., 1882, p. 583; Bouleng., Cat. Liz. ii., p. 461 (1885).

Acerodont. Nostril inferior, between two small nasals, on the side of the large rostral; three large upper head-shields. No limbs. A ventral line, no vertebral or lateral lines. Tail depressed, obtusely pointed. Peræanal pores.



HEAD-SHIELDS OF *PACHYCALAMUS BREVIS*.

(From the Proceedings of the Zoological Society of London.)

This genus is, like *Parachalcides*, peculiar to Sokotra. Although first described by Günther, from Professor Balfour's collection, its correct systematic position was not ascertained until specimens, obtained by Dr. Riebeck, fell into the hands of Peters, who showed it to belong to the Acerodont section of the family, and to be allied to the North African *Trogonophis* and the Somali *Agamodon*.

10. *Pachycalamus brevis*, Günth.

Pachycalamus brevis, Günth., loc. cit. ; Bouleng., loc. cit.

Præmaxillary teeth 3; maxillaries 3-3; mandibulars 6-6. Head depressed, with truncate projecting snout. Rostral large, trapezoid, its posterior border largest, straight, in contact with a pair of large præfrontals; a large frontal, angular anteriorly, nearly as long as broad, sometimes with more or less distinct traces of median division; eye slightly distinct through the ocular, which is sometimes in contact with the fourth upper labial; a large præocular; a subocular (rarely divided into two); 5 upper labials, first very small, fourth and fifth largest. Symphysial narrow, elongate, a little broader anteriorly; chin-shields very small, median hexagonal; 3 lower labials, second largest. Body short. 164 to 173 annuli on the body, and 16 to 20 on the tail; in the middle of the body an annulus contains 48 to 50 segments. Anal segments narrow, 6 to 10. 4 præanal pores. Brown or dark purplish above; head and lower surfaces yellowish white.

Length to vent, 198 millim.; tail, 15; diameter of body, 9·5.

Discovered, in numerous specimens, by Professor Balfour. Further examples were obtained by Dr. Forbes and Mr. Grant on Hadibu Plain, at Dahamis, Jena-agahan, and Homhil.

[This Amphisbænid is common from sea-level to an elevation of about 2000 ft. It is found below stones and is easily captured.—*W.R.O.G.*]

LACERTIDÆ.

Eremias, Wiegman.11. *Eremias guttulata*, Licht.

Eremias (Mesalina) balfouri, Blanf., Proc. Zool. Soc., 1881, p. 467, fig. 2 p. 468.

Sokotran examples of this widely distributed (Morocco to Sind) and highly variable species have been described in detail by Mr. Blanford, and copious notes on the variations in scaling are to be found in the late Dr. John Anderson's beautiful work on the *Reptiles of Egypt*, p. 174. I will therefore content myself with recording the numbers of scales and pores in the specimens collected on the recent expedition.

	Scales round body.	Transverse rows of ventrals.	Femoral pores.
♂ Hadibu Plain	50	26	13—12
„ Hadibu Plain	50	28	14—14
„ Hadibu Plain	52	27	14—15
„ Dahamis	48	28	14—14
„ Homhil	50	27	13—12
„ Jena-agahan	47	26	12—13
„ Jena-agahan	52	26	14—15

		Scales round body.	Transverse rows of ventrals.	Femoral pores.
♀	Hadibu Plain.....	48	30	14—14
„	Hadibu Plain.....	49	30	13—13
„	Hadibu Plain.....	51	30	12—12
„	Homhil.....	47	29	15—14
„	Jena-agahan.....	50	30	11—11
„	Jena-agahan.....	48	30	13—13

The number of scales round the body includes the ventrals, which are constantly in 10 longitudinal series.

[Common from sea level to an elevation of about 2000 feet. Generally seen basking on the ground or on small stones, it is more a lizard of the stony plain than of the rocks.—*W.R.O.G.*]

SCINCIDÆ.

Mabuia, Fitz.

12. *Mabuia socotrana*, (Peters).

Euprepes perrotteti, var., Blanf., Proc. Zool. Soc., 1881, p. 469.

Euprepes socotranus, Peters, Sitzb. Ges. naturf. Fr. Berl., 1882, p. 45.

Mabuia socotrana, Bouleng., Cat. Liz. iii. p. 168 (1887).

Snout moderate, obtuse. Lower eyelid with a transparent disk. Nostril just above or behind the suture between the rostral and the first labial; a postnasal; anterior loreal usually in contact with the first labial; supranasals in contact behind the rostral; frontonasal broader than long, sometimes in contact with the frontal; latter as long as the frontoparietals and interparietal together, in contact with the second, or second and third supraoculars; four supraoculars, second largest and usually touching the præfrontal; four supraoculars, second longest; frontoparietals distinct, smaller than the interparietal; parietals entirely separated; a pair of nuchals; subocular between the fourth and fifth upper labials, nearly twice as long as these shields, not narrowed inferiorly. Ear-opening oval-subtriangular, not quite so large as the eye-opening, with three or four long pointed lobules anteriorly. Dorsal scales mostly tricarinate, sometimes quinque- or septemcarinate; nuchal and lateral scales feebly keeled; 30 to 34 scales round the middle of the body. The hind limb reaches the wrist of the adpressed fore limb, or a little beyond. Subdigital lamellæ smooth. Tail about once and a half as long as head and body. Uniform olive, or with two to six rather indistinct darker longitudinal stripes, head rufous brown; lower parts yellowish white, throat sometimes spotted with black. Young black above, with six white longitudinal lines.

Total length.....	218 millim.	Fore limb.....	27 millim.
Head.....	19 „	Hind limb.....	38 „
Width of head...	13 „	Tail	125 „
Body.....	74 „		

Numerous specimens from Hadibu Plain, Dahamis, Jena-agahan, Homhil, and Adho Dimellus.

[Very common. Frequents the stony plains, and open places and paths on the higher ground.—*W.R.O.G.*]

Parachalcides, *Bouleng.*

Parachalcides, Bouleng., Bull. Liverp. Mus., ii., 1899, p. 6.

Allied to *Chalcides*, Laur., and *Sepsina*, Bocage. Palatine bones not meeting on the middle line of the palate, which is toothless. Teeth conical. Eyelids developed. Ear distinct. Nostril pierced in the rostral, bordered by a supranasal and the first labial; prefrontals and frontoparietals absent. Body much elongate; limbs short.

13. *Parachalcides socotranus*, *Bouleng.* (Plate xi. fig. 1).

Parachalcides socotranus, Bouleng., loc. cit.

Snout short, obtuse, not projecting beyond the labial margin; eye moderate; lower eyelid with a transparent disk; ear-opening small. Frontal more than twice as long as the frontonasal, longer than broad, brownish behind, angularly notched on each side by the supraocular; interparietal nearly as long as the frontonasal; 5 supraoculars, second largest; no postnasal; first upper labial nearly as deep as the rostral; fourth upper labial entering the orbit. 24 smooth scales round the middle of the body, subequal in size. Limbs short, pentadactyle; the fore limb, stretched forwards, does not quite reach the ear; hind limb a little longer than the head; third finger longest; fourth toe a little longer than third. Tail thick, cylindrical. Reddish brown above, each scale with a black spot; sides blackish, or closely spotted and dotted with black; yellowish white beneath, uniform or dotted with black.

Total length.....	118 millim.	Fore limb.....	7 millim.
Head.....	10 ,,	Hind limb.....	11 ,,
Width of head...	6 ,,	Tail	58 ,,
Body.....	50 ,,		

Numerous specimens from Dahamis (350-1000 ft.), Jena-agahan (1200-2500 ft.), Homhil (1500-2500 ft.), Adho Dimellus (3500-4000 ft.).

[This interesting new Skink was met with on the granite from the lower slopes of the Haghier range, to an elevation of about 4000 ft. It was also fairly common in the limestone ranges round Homhil, at the east end of the island. In spite of its short legs it is extremely active and rather difficult to catch, without injuring the tail. It was never seen moving about in the daytime, unless disturbed from beneath stones, and it may therefore be concluded that, like the various species of *Gecko*, *Hemidactylus* and *Phyllodactylus*, its habits are nocturnal.—*W.R.O.G.*]

RHIPTOGLOSSA.

CHAMÆLEONTIDÆ.

Chamæleon, Laur.

14. Chamæleon monachus, Gray.

Chamæleon monachus, Gray, Proc. Zool. Soc., 1864, p. 470, pl. xxxi.; Blauf., Proc. Zool. Soc., 1881, p. 464; Bouleng., Cat. Liz. iii., p. 451 (1887).

Casque moderately raised posteriorly; a strong parietal crest; the distance between the commissure of the mouth and the extremity of the casque equals or slightly exceeds the length of the mouth; no rostral appendages; lateral crest strong, not extending to the occiput; occipital lobes very large, united behind the extremity of the casque, covered with large, flat, roundish tubercles separated by fine granulation. Body and throat covered with small granules intermixed with strongly enlarged, round, flat or subconical, equidistant tubercles; large conical tubercles form a distinct crest along the vertebral line; a crest of long pointed tubercles along the throat; a series of slightly enlarged granules along the ventral line, not forming a crest. Male with a tarsal process or spur. Tail as long as or a little longer than head and body. Gular-ventral line white; many of the tubercles of the dorsal crest white; mouth margined with white; sides with white spots or marblings.

	♂	♀
Total length	352 millim.	289 millim.
From end of snout to extremity		
of mandible.....	37 „	34 „
From end of snout to extremity		
of casque.....	52 „	46 „
Greatest width between lateral		
cranial crests.....	20 „	16 „
Depth of skull (mandible included)	37 „	33 „
Width of head.....	27 „	21 „
Body.....	137 „	110 „
Tibia.....	32 „	29 „
Tail.....	178 „	145 „

Numerous specimens were obtained by Professor Balfour, and by Mr. Grant and Dr. Forbes in the following localities: Hadibu Plain, Dahamis, Homhil, Adho Dimellus.

[The Chameleon was fairly common on all parts of the island visited, ranging from sea-level to the highest ground. One finds it walking slowly and sedately about among the branches of the low bushes or perched motionless lazily enjoying the hot sunshine, its goggling eyes

fixed apparently on space, and with an air of sleepy indifference to the world in general. It always cost one a pang to have to put this delightful reptile in spirits, for it makes no attempt to escape, and is apparently devoid of all fear. One brought off alive to the 'Elphinstone' lived happily in a cabin for some days till a wretched cabin-boy knocked it on the head and threw it out of the port.—*W.R.O.G.*]

OPHIDIA.

TYPHLOPIDÆ.

Typhlops, Schn.

15. *Typhlops socotranus*, Bouleng.

Typhlops socotranus, Bouleng., Cat. Snakes, i., p. 21, pl. ii., fig. 2 (1893).

Snout rounded, very prominent; nostrils lateral. Rostral about one-third the width of the head, not extending to the level of the eyes; nasal incompletely divided, the cleft proceeding from the second labial; præocular present, broader than the nasal or the ocular, in contact with the second and third labials; eyes distinct; upper head-scales slightly enlarged; 4 upper labials. Diameter of body 31 to 50 times in the total length; tail as long as broad, ending in a spine. 24 or 26 scales round the body. Yellowish white, with brown or black lines running between the dorsal series of scales.

Total length, 260 millim.

The types of this burrowing snake were obtained by Professor Balfour.

A larger specimen, from Dahamis, forms part of Messrs. Grant and Forbes's collection.

GLAUCONIIDÆ.

Glauconia, Gray.

16. *Glauconia filiformis*, Bouleng. (Plate xi. fig. 2).

Glauconia filiformis, Bouleng., Bull. Liverp. Mus., ii., 1899, p. 7.

Very closely allied to *G. macrorhynchus*, Jan, with which it agrees in the very prominent, hooked snout, the number and arrangement of the head shields, and the extremely slender form. It differs in the more pointed snout, and in the rostral shield not extending so far back as the level of the eyes. 14 scales round the body. Diameter of body, 100 to 140 times in the total length, length of tail 13 times. Caudal spine small. Flesh-coloured, each dorsal scale with a pale brown spot.

Total length, 155 millim.

Four specimens from Dahamis (350 ft.), Jena-agahan (1200-2500 ft.), and Homhil (1500-2500 ft.).

[This curious species, met with on the lower and middle zones of the granite and limestone hills, was either very rare or difficult to find, for after catching the first at Dahamis, we made every effort to obtain more, but without much result. It lives in holes in the ground below stones, and when one has been lucky enough to turn up the right one, a portion of the worm-like body may be seen protruding from the burrow. The movements are fairly swift, and, when once exposed to the light, the body, unless promptly seized, is quickly withdrawn.—*W.R.O.G.*]

17. *Glauconia macrura*, *nom. nov.* (Plate xi. fig. 3).

Glauconia longicauda (non Peters), Bouleng., Bull. Liverp. Mus., ii., 1899, p. 7.

Snout pointed, strongly projecting, slightly hooked; supraocular present; rostral moderately large, not extending to the level of the eyes, its upper portion a little longer than broad; nasal completely divided into two, the lower part very small; ocular covering the lip, between two labials, the anterior of which is very small; five lower labials, 14 scales round the body. Diameter of body 40 to 48 times in the total length; length of tail 5 to 7 times. Caudal spine strong. Brown above, white beneath. Total length 170 millim.

Numerous specimens from Dahamis, 350 feet; Jena-agahan, 1200-2500 feet; and Homhil, 1500-2500 feet.

In describing this snake for the first time I overlooked the fact that the name *longicauda* had already been bestowed on a species of the genus *Glauconia*.

[The range and habits of this reptile are similar to those of the last, but it was much more abundant.—*W.R.O.G.*]

COLUBRIDÆ.

***Zamenis*, Wagl.**

18. *Zamenis socotræ*, Günth.

Zamenis socotræ, Günth., Proc. Zool. Soc., 1881, p. 463, pl. xli.; Bouleng., Cat. Snakes i. p. 408 (1893).

Snout feebly projecting, obtuse. Rostral once and one third to once and a half as broad as deep, the portion visible from above measuring one fourth to one third its distance from the prefrontals; frontal much wider than the supraocular, once and a half to once and two thirds as long as broad, longer than its distance from the end of the snout, as long as or a little shorter than the parietals; loreal nearly twice as long as deep; two præoculars, separated from the frontal, with a subocular below them; two postoculars, and a subocular separating the eye from the sixth and seventh labials; temporals 3 + 3

or 2 + 3; 10 upper labials, fifth entering the eye; 4 or 5 lower labials in contact with the anterior chin-shields; posterior chin-shields longer than the anterior, but extremely narrow and separated from each other by two or three series of scales. Scales smooth, in 23 rows. Ventrals obtusely angulate laterally, 219-228; anal divided; subcaudals 107-123. Head olive above; body with olive, sometimes black-edged transverse bands, separated by narrower salmon-red interspaces; belly yellowish or pale olive.

Total length 860 millim.; tail 225.

This beautiful snake is only known from Sokotra, three specimens having been brought home by Professor Balfour. The present expedition yielded but a single specimen from Hadibn Plain, a female with 227 ventral shields and 123 pairs of caudals.

[Only once seen, the day we landed on Sokotra, by the side of a path near the sea.—*W.R.O.G.*]

Dityopphis, Gunth.

Dityopphis, Günth., Proc. Zool. Soc., 1881, p. 462; Bouleng., Cat. Snakes, iii, p. 46 (1896).

Maxillary teeth 8 or 9, strongly increasing in length to the last but one, followed, after an interspace, by a large, grooved fang; second to fifth mandibular teeth strongly enlarged, fang-like. Head distinct from neck; eye moderate, with vertically elliptic pupil. Body short, cylindrical; scales smooth, with apical pits, in 21 or 23 rows; ventrals rounded. Tail short; subcaudals single. Hypapophyses developed throughout the vertebral column.

Like *Pachycalamus* and *Parachalcides*, this genus is represented by a single species peculiar to Sokotra.

19. *Dityopphis vivax*, Günth.

Dityopphis vivax, Günth., loc. cit. pl. xl.; Bouleng., loc. cit., fig. 3.



HEAD-SHIELDS OF *DITYOPHIS VIVAX*.

(From the Proceedings of the Zoological Society of London.)

Snout short, broad, truncate, with distinct canthus and feebly grooved

loreal region; rostral more than twice as broad as deep, scarcely visible from above; internasals as long as broad, or a little longer than broad, as long as or longer than the præfrontals; frontal not broader than the supraocular, once and two-thirds to twice as long as broad, as long as its distance from the end of the snout, shorter than the parietals; nostril pierced in the upper part of an undivided nasal; loreal a little longer than deep; one præocular, forming a suture with the frontal; a subocular below the præocular; two postoculars; temporals small, scale-like, 2×3 or 4 ; 8 upper labials, fourth and fifth entering the eye; 4 or 5 lower labials in contact with the interior chin-shields, which are nearly as long as the posterior. Scales in 21 (rarely 23) rows. Ventrals 142-154; anal entire; subcaudals 34-44. Reddish, sandy, or orange-red above, uniform, or with indistinct darker cloudy spots on the back, and a dark streak on each side of the head, passing through the eye; grey or grey-brown with black spots disposed alternately, with two principal series along the back, a black streak on the side of the head, and black vertical bars on the lips; lower parts white.

Total length, 440 millim.; tail, 60.

This remarkable snake, of viperine aspect due to its short body and vertical pupil, was known from a single specimen in Professor Balfour's collection. The present collection contains 8 specimens, one of which (from Hadibu Plain) is remarkable for its uniform orange-red coloration and the presence of 23 series of scales instead of 21. The numbers of ventral and caudal shields are as follows:—

♀ Hadibu Plain	v. 152	c. 37
♂ Adho Dimellus	150	42
♂ „	146	42
♀ „	154	36
♀ „	154	34
Hgr. Jena-agahan.....	142	44
„ Homhil.....	153	35
Yg. „	148	41

[Apparently most numerous on the higher hills of the Haghier range where most of the specimens were secured.—*H.R.O.G.*]

VIPERIDÆ.

Echis, *Merr.*

20. *Echis coloratus*, *Günth.*

One specimen of this species, which inhabits Palestine, Egypt, and Arabia, was found by Professor Balfour. It is the only Sokotra Reptile which was not re-discovered by Mr. Grant and Dr. Forbes.

[*The Periplus of the Erythraean Sea* (A.D. 100) mentions the presence of “a great many vipers in Sokotra,” a note which may refer to the very viper-like *Dityophis virax*.—*H.O.F.*]

CHELONIA.

[TESTUDINIDÆ.

Among the products of the Island of Dioscorides mentioned by the author of the *Periplus*, besides turtle-shell of the largest size and best kind, are also tortoises, "the gemine land, white and mountain sort, with shells of extraordinary size," "the lower shell of a ruddy yellow and too hard to be cut." Considering that the investigation of the Flora of Sokotra unquestionably indicates that in former times there existed between Sokotra and the Mascarene Group, if not an actual union (which is highly probable), at least a near approximation of the latter to the larger Africa of which Sokotra then formed a part, this observation appears to me to be peculiarly suggestive. Could this mountain tortoise really be a *Testudo* related to those of the Seychelles, Aldabra, and others of the Mascarene archipelago? I think it highly probable. I regret that I did not sufficiently note this passage in the *Periplus* before setting out for Sokotra, and so made no enquiries as to the remains of such a tortoise now in any of the limestone caves or sequestered valley-heads of the Haghier range. Were any survivor of those giant reptiles still to be found, I think we could hardly have failed to hear of it, for I was constantly making enquiries of the natives about bone-deposits and all the products of the island through our most intelligent interpreter: but it would be specially interesting and important to discover if any traditions of their former presence be still lingering among the people. I trust that some future visitor to Sokotra may try and obtain information on this subject. None of the limestone caves I examined contained osseous remains of any kind.—*H.O.F.*]

CHELONIDÆ.

Chelone, Brongn.

21. *Chelone imbricata* ? (*Linn.*).

Chelone imbricata, Bouleng., Cat. Chelon., p. 183 (1889).

The Hawk's-bill Turtle, we learned, frequents the south coast of Sokotra, but in former times it appears to have been captured more abundantly than now. We did not see it on the north coast, and its shell was not, so far as I could learn, much collected as an article of commerce. It would seem to have been far more so eighteen centuries ago, when the merchants of Mooza [on the Arabian shore of the Red Sea] and Barugaza [in the Gulf of Cambay] visited the island and received in exchange for their Indian and Arabian wares "as fresh cargo, great quantities of turtle shell."

[Although we did not hear or see any evidences of the presence of *Chelone mydas*, there can be no doubt it also occurs in Sokotra.—*H.O.F.*]

EMYDOSAURIA.

[We are again indebted to the *Periplus of the Erythrean Sea* for the record that in the first century of our era Crocodiles were included in the fauna of Sokotra, which has "rivers and crocodiles and a great many vipers and lizards of enormous size . . ." They have now, however, gone the way of, no doubt, many another species, and we did not even hear of their former existence. The species one would expect to have found would be *Crocodilus niloticus*.—H.O.F.]

II.—Reptiles of Abd-el-Kuri.

Examples of three species of Geckos are all that was collected in the way of Reptiles on this small island, but two of them constitute very well marked new species.

LACERTILIA.

GECKONIDÆ.

Pristurus, *Rupp.*

1. *Pristurus rupestris*, *Blanf.*

See remarks above, p. 66.

The few specimens collected do not show the stripes which are so well defined in many of the Sokotra examples. In this respect they are quite similar to the types from Arabia and the Persian Gulf.

Hemidactylus, *Cuv.*

2. *Hemidactylus oxyrhinus*, *Bouleng.* (Plate x. fig. 2).

Hemidactylus oxyrhinus, Bouleng., Bull. Liverp. Mus., ii., 1899, p. 5.

Snout pointed, slightly longer than the distance between the eye and the ear-opening, which equals the diameter of the orbit; forehead slightly concave; ear-opening small, oval, oblique. Body and limbs moderate. Digits moderately dilated, free: 7 or 8 lamellæ under the thumb, 8 or 9 under the fourth finger, 6 or 7 under the hallux, 11 or 12 under the fourth toe. Head covered with small convex granules increasing in size posteriorly; rostral subquadrangular, not twice as broad as deep, with median cleft above; nostril pierced between the rostral, the first upper labial, and 3 small scales: 8 to 10 upper and 7 or 8 lower labials; symphysial large, triangular, more than twice as long as the adjacent labials; four chin-shields, median pair largest and in contact behind the symphysial. Back covered with equal or subequal, rather large, obtusely keeled, juxtaposed tubercles; ventral scales much smaller, cycloid, smooth, subimbricate. Male with two preanal pores. Tail cylindrical, tapering, covered with uniform small smooth scales, with a median series of transversely enlarged plates inferiorly. Pale buff or greyish brown, with more or less distinct darker markings in the form of 4 wavy cross-bars on the nape and back and annuli on the

tail; the caudal annuli black in the young, separated by white interspaces; a dark streak on each side of the head, passing through the eye.

Total length.....	95 millim.	Fore limb.....	15 millim.
Head.....	13 „	Hind limb.....	20 „
Width of head....	10 „	Tail	52 „
Body	30 „		

The largest specimen, with reproduced tail, measures 50 millim. from snout to vent.

Several specimens were obtained by the Expedition.

[Not very common.—*W.R.O.G.*]

3. *Hemidactylus forbesii*, Bouleng. (Plate ix. fig. 2).

Hemidactylus forbesii, Bouleng., Bull. Liverp. Mus., ii., 1899, p. 5.

Closely allied to *H. flaviviridis*, Rüpp. (*roctei*, D. and B.). Snout obtusely pointed, longer than the distance between the eye and the ear-opening, once and one-third the diameter of the orbit; forehead concave; ear-opening large, oval, oblique. Body and limbs moderate. Digits moderately dilated, less than in *H. flaviviridis*, free; 11 or 12 lamellæ under the thumb, 11 or 12 under the fourth finger, 10 or 11 under the hallux, 14 or 15 under the fourth toe. Head covered with uniform granules, largest on the sides of the snout; rostral not twice as broad as deep, notched and cleft above; nostril pierced between the rostral and 3 small scales; first upper labials sometimes entering the nostril; 10 or 11 upper and 8 or 9 lower labials; symphysial large, triangular, at least twice as long as the adjacent labials; a pair of large chin-shields, forming a suture behind the symphysial, usually flanked by a pair of much smaller shields. Back covered with minute granular scales, among which slightly enlarged, round tubercles may be irregularly scattered; ventral scales slightly larger, much smaller than in *H. flaviviridis*, juxtaposed or subimbricate. No præanal or femoral pores. Tail moderately depressed, tapering to a fine point, covered very small smooth scales, and a few scattered pointed tubercles on its basal part; no regular series of transversely enlarged, lamellar plates on the lower surface. Pale greyish above, with rather indistinct brown spots and marblings on the head and body and cross-bars on the tail; white beneath.

Total length.....	198 millim.	Fore limb.....	36 millim.
Head	24 „	Hind limb.....	45 „
Width of head....	17 „	Tail	115 „
Body.....	59 „		

Numerous specimens were collected.

[Very common below stones.—*W.R.O.G.*]

CHELONIA.

[CHELONIDÆ.

Chelone, *Brongn.*4. **Chelone mydas** (*Linn.*).

Chelone mydas, Bouleng., Cat. Chelon., p. 180 (1889).

I saw fragments of carapaces of the Green Turtle in the neighbourhood of the hut-cluster inland from our anchorage at Abd-el-Kuri.—*H.O.F.*

5. **Chelone imbricata** (*Linn.*).

Chelone imbricata, Bouleng., loc. cit., p. 183.

Round the huts of the natives were scattered great numbers of the entire but stripped carapaces of the Hawk's-bill Turtle, showing that they collect the shell in considerable quantity. This small island, with its numerous sandy beaches, is quite a tempting place for these reptiles to deposit their eggs upon. I purchased a small quantity of shell of excellent quality.—*H.O.F.*

Thalassochelys, *Fitzing.*[6. **Thalassochelys caretta** (*Linn.*).

Thalassochelys caretta, Bouleng., loc. cit., p. 184.

I found on the beach at Bander Saleh the bones of the Loggerhead Turtle in great numbers. The length of a femur, which seemed to me to be unusually large, measured 17·5 centimetres; the mandible, of apparently the same skeleton, was 18 centimetres long.—*H.O.F.*]

PLATE VIII.

PHYLLODACTYLUS RIEBECKII, *Blgr.*, p. 78.



PLATE IX.

Fig. 1. **PHYLLODACTYLUS TRACHYRHINUS**, *Blgr.*, p. 79.

Fig. 1a. *Labial scales of same.*

Fig. 1b. *Under surface of foot of same.*

Fig. 2. **HEMIDACTYLUS FORBESII**, *Blgr.*, p. 95.

Fig. 2a. *Labial scales of same.*

Fig. 2b. *Under surface of foot of same.*



J. Green del et lith.

Mintern Bros imp

1. PHYLLODACTYLUS TRACHYRHINUS.
2. HEMIDACTYLUS FORBESII.

PLATE X.

Fig. 1. **HEMIDACTYLUS PUMILIO**, *Blgr.*, p. 81.

Fig. 1a. *Labial scales of same.*

Fig. 1b. *Under surface of foot of same.*

Fig. 2. **HEMIDACTYLUS OXYRHINUS**, *Blgr.*, p. 94.

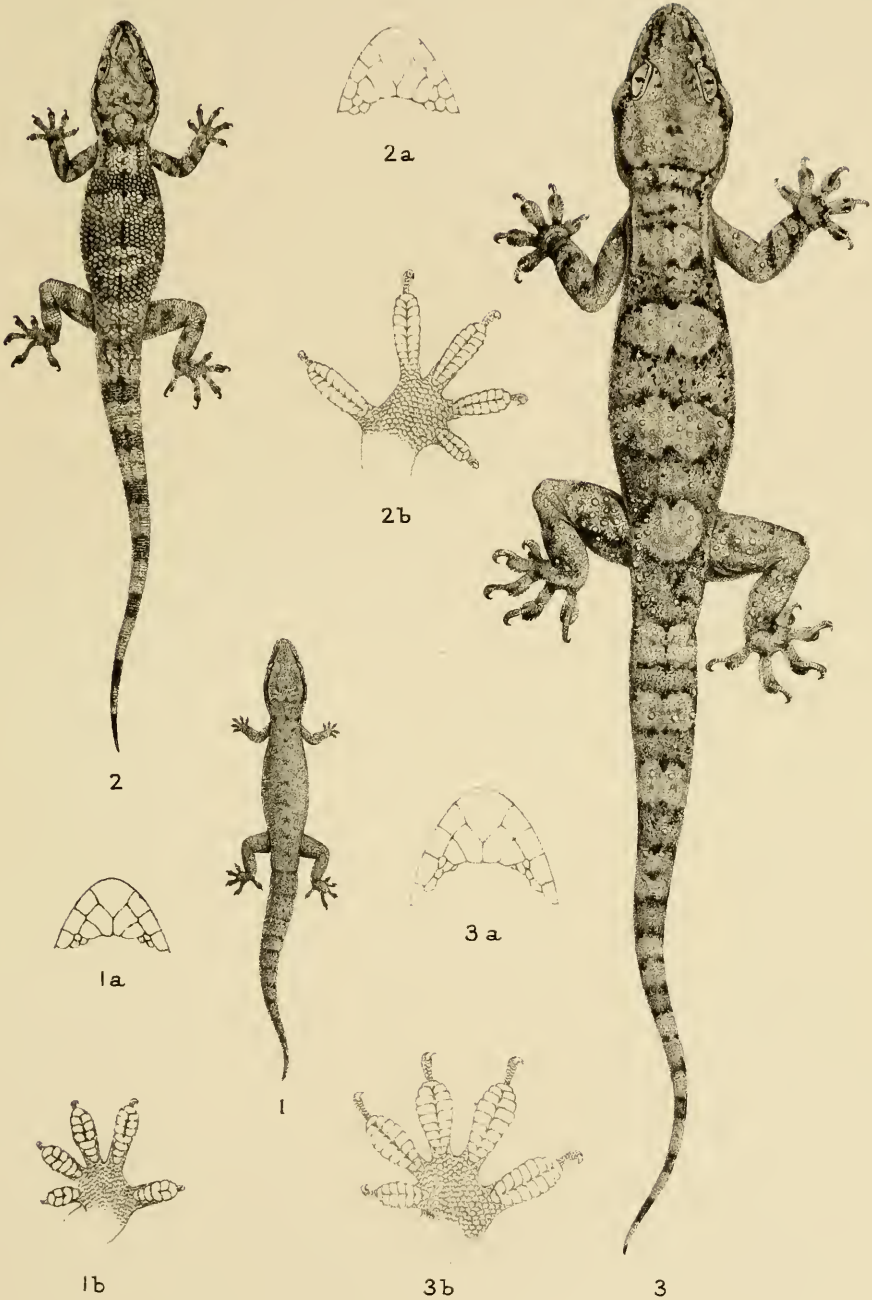
Fig. 2a. *Labial scales of same.*

Fig. 2b. *Under surface of foot of same.*

Fig. 3. **HEMIDACTYLUS GRANTI**, *Blgr.*, p. 81.

Fig. 3a. *Labial scales of same.*

Fig. 3b. *Under surface of foot of same.*



J. Green del. et lith.

Miner Bros. imp.

1. HEMIDACTYLUS PUMILIO. 2. H. OXYRHINUS.
3. H. GRANTI.

PLATE XI.

Fig. 1. **PARACHALCIDES SOCOTRANUS**, *Blgr.*, p. 86.

Fig. 1a. *Head of same from above.*

Fig. 1b. *Head of same, side view.*

Fig. 2. **GLAUCONIA FILIFORMIS**, *Blgr.*, p. 88.

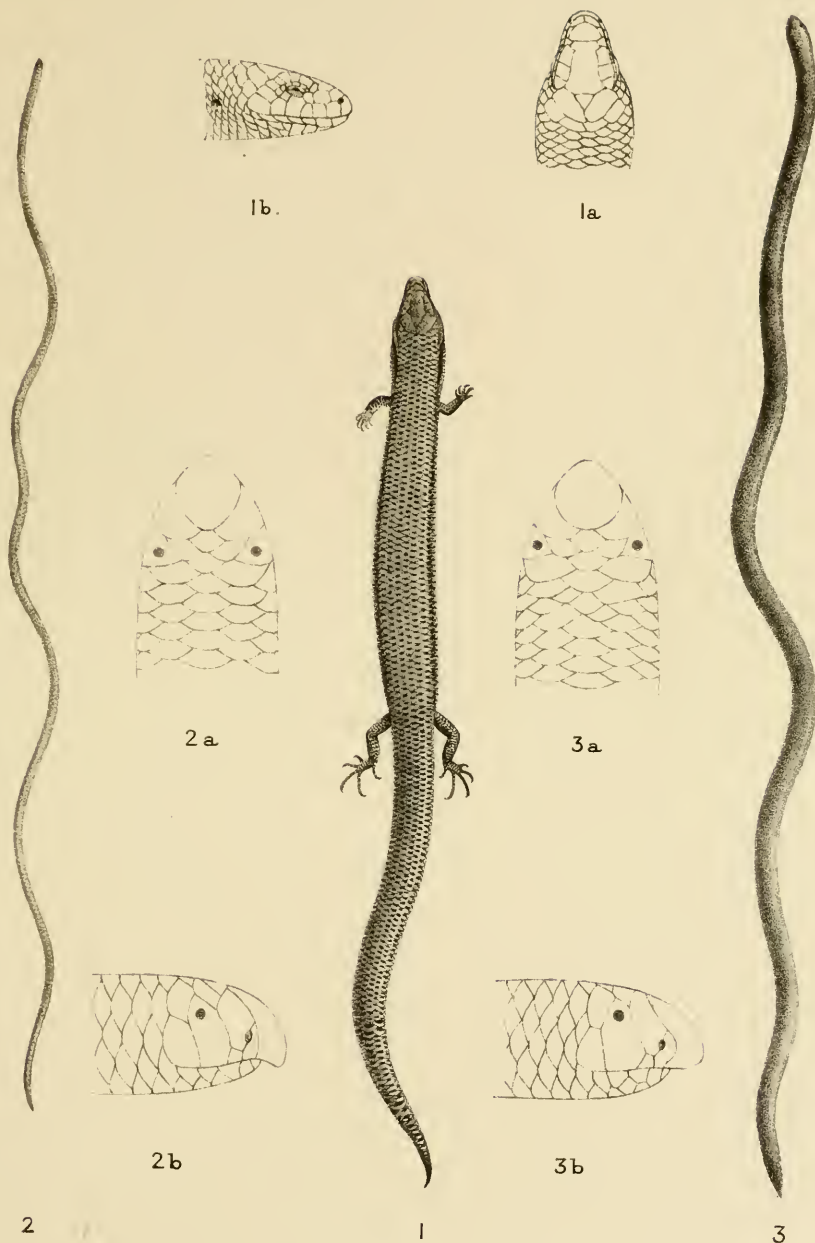
Fig. 2a. *Head of same from above.*

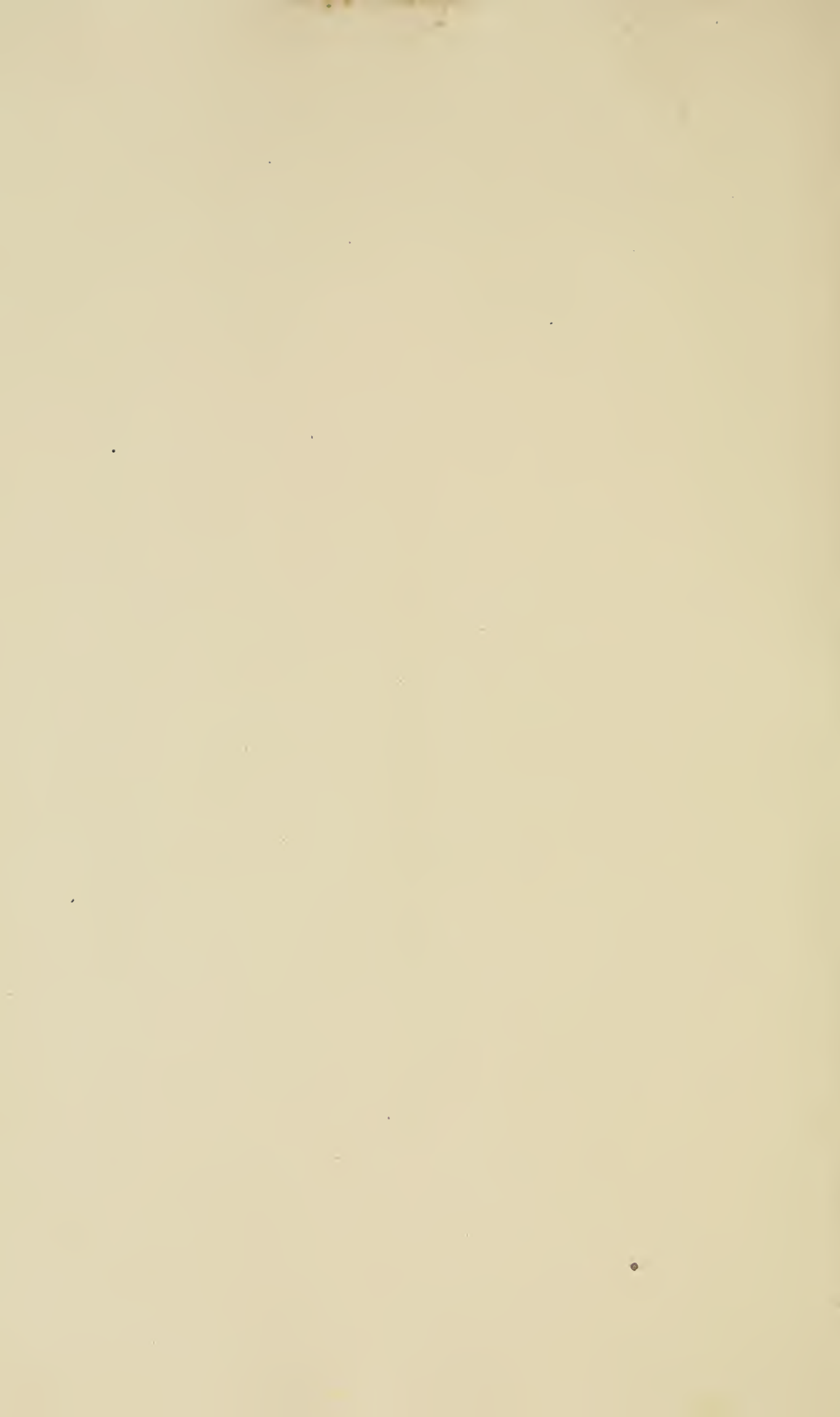
Fig. 2b. *Head of same, side view.*

Fig. 3. **GLAUCONIA MACRURA**, *Btgr.*, p. 89.

Fig. 3a. *Head of same from above.*

Fig. 3b. *Head of same, side view.*





CHORDATA.
VERTEBRATA.

Batrachia.

Pisces.

PROPERTY OF
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Note by HENRY O. FORBES, LL.D.

Batrachians and Fishes.

The absence of indigenous Mammals in Sokotra prepares us for the absence of **Frogs, Toads**, and **Newts** also from the islands. Neither in Sokotra nor in Abd-el-Kuri did we discover any signs of these forms of life, a fact which indicates a very long severance of the islands from the nearest continental lands.

As the main object of our expedition was to investigate the Land and Fresh-water Fauna of the islands, little or no attention was paid to their marine zoology. We brought home only, therefore, a few of the more portable specimens of **Sea-Fishes**, kindly caught for us over the side of the 'Elphinstone' or in the rock pools on the shore, for the most part by the officers of the ship while she was lying at Sokotra and Abd-el-Kuri. These were all well-known species of *Serranus*, *Labrax*, *Caranx*, *Pristipoma*, *Murena*, *Mugil*, and *Beryx*.

As to **Fresh-Water Fishes**, none exist in **Abd-el-Kuri**, for the sufficient reason that there are no permanent streams there. We saw no running water anywhere during our visit, and no rock pools in the ravines in which a fish could survive the dry season. Even in the wet season the rains, which must, from the evidences we saw, be very heavy, find their way to the sea through a high sand barrier which skirts the shores of the island.

In **Sokotra** the majority of the rivers have also no exit into the sea in the dry season, being lost in the soil before reaching it. In the wet season they must all at times be torrents of large size, flowing with great velocity and violence, judging by the enormous boulders now lying in their beds which they have transported into the plains. Of those crossing the Hadibu Plain, however, all have estuaries. In a deep pool in the Hlaneфу river, above the town of Hadibu, and about a mile and a quarter from the sea, I saw several dark-coloured, trout-like fishes, about 8 to 10 inches in length, in form and action resembling *Salmonidae*; but both I and several of our servants, who tried to capture specimens, unfortunately failed. It is, consequently, still a question whether they were truly river species or marine forms which had come thus far up from the sea. Above the estuarine waters

of rivers reaching the sea, and in all the streams, without exception, in the mountains, everyone of them just such as might be expected to harbour river fishes, not a single specimen was seen. The natives also told us that none existed away from the sea. The probability, therefore, is that those seen in the Hanefu were marine species. Captain Hunter, an accurate observer, who, when Political Resident in Aden, paid a visit to Sokotra in 1876, notes that :—"In the rivers, two kinds of fresh-water fish are to be found, both in size about a finger's length, and one kind having a series of concentric, alternately black and yellow, oval rings on the back, making the fish resemble an elongated target. The natives assert that these fish went down to the sea when they grew larger." From their brilliant colouring, it is likely that these were fry of marine species also.

A couple of specimens brought home by Professor Balfour from one of the rivers of Hadibu plain proved to be *Kuhlia teniura* (Blgr. Cat. Fishes B.M., Vol. i., p. 39), a marine form common to East and South Africa, and the islands of the Indian and tropical Pacific oceans.

MOLLUSCA.

Gastropoda.

By EDGAR A. SMITH, F.Z.S.

PLATES XII., XIII.

Land and Fresh= Water Shells.

A very complete account of the Molluscan fauna of Sokotra and Abd-el-Kuri was given by the late M. Crosse in the *Journal de Conchyliologie* for 1884, pp. 341-375, in which all the known species were enumerated with synonymy and references. Some remarks upon the character and relationship of the fauna were also appended. Little, therefore, remains to be done, except to bring this Catalogue up to date, and to discuss certain points in synonymy which an examination of many of the types has made necessary. The present writer is fortunate in having the types described by Godwin-Austen available for study, also a fine series of specimens collected by Mr. and Mrs. Theodore Bent in 1896, besides the collections made by Dr. Forbes and Mr. Grant.

Forty species of land shells were catalogued by M. Crosse from Sokotra, 28 inoperculated and 12 operculated. Fifteen additional species of the former and one of the latter are now added to the list. Of these it is worthy of notice that only one, the *Succinea sokotrensis*, belongs to a genus previously unknown in Sokotra.

I.—The Land and Fresh=Water Shells of Sokotra.

TESTACELLIDÆ.

Ennea, H. & A. Adams.

1. *Ennea cylindracea*, Smith.

Ennea cylindracea, Smith, Journ. Malac., vol. vi. p. 34, pl. v. fig. 1.

*



(ENLARGED).

* Figures in the text of this paper with an asterisk over them are from drawings most generously made for me by Mr. E. A. Smith: the others are from the *Proceedings of the Zoological Society of London* with the kind permission of the Council.—Editor.

Shell small, narrow, cylindrical, imperforate, white, pellucid; spire elongate, mammillated at the apex: whorls six, slowly increasing, the first globose, the three following somewhat convex, the last and penultimate flattish, divided by a deep oblique suture, striated with fine lines of growth, the last subascending in front, finely costulate-striated behind; aperture irregularly subquadrate, small, equalling $\frac{1}{4}$ the whole length, with a single parietal tooth; peristome slightly thickened, margins joined with a conspicuous callus, the outer slightly sinuated near the suture, the columellar dilated, prominent and sub-plicate within.

Length 7, diameter 2 mm.; aperture 1.6 long, 1.25 broad.

Sokotra.

[This species was collected by Mrs. Theodore Bent; but not by us.]

[The occurrence of the following species in Sokotra is doubtful:—

Ennea ovoidea (Brug.).

Buliminus ovoidens, Bruguière, Encycl. Méth., i. p. 335 (1792): Crosse, Op. cit. p. 357.

East Africa.]

SUCCINEIDÆ.

Succinea, *Draparnaud*.

2. Succinea sokotrensis, *sp. n.* (Plate xiii. fig. 17.)

Shell small, moderately solid, reddish; spire moderately elongate, mammillated at the apex; whorls $3\frac{1}{2}$, very convex, rapidly increasing, the last descending in front, striated with fine oblique lines of growth; aperture small, irregularly ovate, slightly exceeding half the whole length; peristome slightly thickened, margins joined with a thin callus.

Length 7.5, diameter 4 mm.; aperture 4 mm. long and $2\frac{1}{2}$ broad.

Sokotra (Type collected by Mrs. Bent).

In form somewhat resembling the European *S. oblonga*.

Some specimens are thinner than others, being perhaps less adult shells.

It seems probable that, had they survived longer, they would have become more solid.

[This species, discovered by Mrs. Bent, was not met with by us.—*H.O.F.*]

PUPIDÆ.

Buliminus *Beck*.

3. Buliminus (*Passamaia*) **passamaianus** (*Petit*).

Pupa passamaiana, Petit, Journ., Conch., 1853, p. 366, pl. xiii. figs. 7, 8.

Buliminus passamaianus, Crosse, Op. cit. p. 344; Kobelt, Conch. Cab. (Ed. 2), p. 616, pl. xciv. figs. 1-3.

Ennea passamaiana, Godwin-Austen, P.Z.S., 1881, p. 808, pl. lxxviii. fig. 11.

"Shell shortly conical, widely umbilicated, white; spire subobtuse, whorls 6, somewhat convex, ornamented with oblique regular striae,



FIG. a.

(ENLARGED.)

FIG. b.

the last dilated; aperture contracted, dentate; columella angulate in the middle, toothed below; labrum much curved within at the middle, and toothed, scarcely reflexed."

"Height 11 mm., diameter 8 mm."—(Translation from *Petit*).

Var. **euryomphala**, *var. n.* (Plate xiii. fig. 3.)

Shell like the Type, but shorter, more widely excavated below, with more convex whorls, and a stronger labral tooth.

A single specimen collected by Mrs Theodore Bent differs from the typical form in the above particulars. It is quite possible that these differences may eventually prove constant when further specimens have been obtained, for, judging from the series of *Passamaiaella* examined, the species do not exhibit much variation.

[This species was not collected by us.—*H.O.F.*]

4. **Buliminus** (*Passamaiaella*) **isthmodon**, *Martens*.

Buliminus isthmodon, Martens, Nachrbl. Deutsch. Malak. Ges., xiii. p. 136 (1881).

Buliminus isthmodon, Crosse, Op. cit. p. 345; Kobelt, Conch. Cab. (Ed. 2), p. 620, pl. xciv. figs. 10, 12.

The following is a translation of the original description of this shell:—

Shell conic-globose, arcuate-rimate, costulated, somewhat glossy, uniformly reddish-yellow; whorls 5, the first papilliform, smooth, the antepenultimate and penultimate with very oblique riblets, the last globose, with curved costulae, subcompressed at the base; aperture small, contracted by two coarse sub-bitubercular opposite teeth, one external, the other on the columella; peristome thickened, reflexed, white, the margins subparallel and prolonged downwards, the columellar side incised at the point of insertion.

Length 15, diameter $12\frac{1}{2}$ mm.; aperture, including peristome, 10 long and 7 wide.

Sokotra : Dahamis (350-1000 ft.).

[In crevices of the granite rocks : and under stones in the dry Wadis.—
H.O.F.]

5. *Buliminus* (*Passamaia*) *bentii*, *Smith*.

Buliminus (*Passamaia*) *bentii*, *Smith*, *Journ. Malacol.*, vol. vi. p. 35,
pl. v. fig. 3 ; *Kobelt*, *Conch. Cab.* (Ed. 2), p. 618, pl. xciv. fig. 5.



(ENLARGED).

The following is the original description of the species :—

Shell irregularly ovate, acuminate above, white (?), or brownish, rimate ; spire convex-conoid, obtusely mammillated at the apex ; whorls 5, somewhat quickly increasing, the first two convex, smooth ; the two following less convex, very obliquely striated, the last obliquely descending behind, but close to the lip subascending, deeply impressed behind the middle of the lip and beneath the umbilical chink : aperture irregular, oblique, ear-shaped, contracted ; peristome slightly incrassate, narrowly expanded and reflexed, the margins almost united with a conspicuous straight but oblique callus, the outer bituberculated within in the middle, and the columellar with a strong, elongated, oblique fold.

“Length 18·5, diameter 10 mm.

“The form of this interesting species is very remarkable, and at once distinguishes it from the other allied species. The great contraction of the aperture is very peculiar ; it is also remarkable in that the parietal callus does not actually join the extremities of the peristome, but is separated both above and below by a slight notch or channel.”

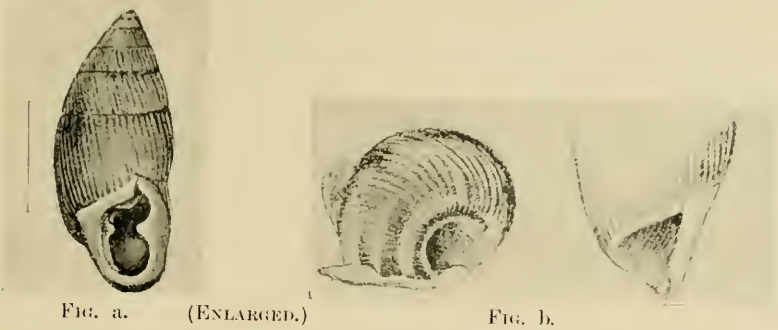
[Not obtained by the present expedition.—*H.O.F.*]

6. *Buliminus* (*Passamaia*) *bayleyi*, *nom. nov.*

Ennea balfouri, *Godwin-Austen*, *P.Z.S.*, 1881, p. 809, pl. lxxviii. fig. 12 ;
Crosse, *Op. cit.* p. 346 ; *Kobelt*, *Conch. Cab.* (Ed. 2), pl. xciv. fig. 7,
erroneously placed as synonym of *B. exodon*.

Col. Godwin-Austen's original description is as follows :—

"Shell elongately fusiform, rather solid ; sculpture very regular shallow



ribbing ; colour wax-white, or dull pale umber ; spire elongated, sides convex, apex blunt ; suture shallow ; whorls 6, flatly convex aperture subvertical, oval, one flat-shaped tooth on body whorl peristome continuous, with a narrow notch on the upper outer margin of the aperture ; columellar margin strong, with a single tooth, and one largely developed triangular tooth on the outer margin.

"Major diameter 6·1, alt. axis 14·5, alt. apert. 6·2 mm."

"On the slopes of the ridge bounding the Gollonsir Valley, at an altitude over 500 feet."—*Balfour*.

This species was originally placed in the genus *Ennea* by Godwin-Austen, and consequently he was justified in employing the specific name *balfouri* which he had already assigned to a species of *Buliminus*. As the present species is now considered to belong to the latter genus, it becomes necessary to give it another designation, and I therefore propose to associate it with the christian name of Professor Balfour, who collected it.

[This species was not obtained by us.—*H.O.F.*]

7. *Buliminus* (*Passamarella*) *mirabilis*, *Smith*. (Plate xii. fig. 12.)

Buliminus (*Passamaella*) *mirabilis*, *Smith*, Journ. Malacol., vol. vi. p. 34, pl. v. fig. 2 ; Kobelt, Conch. Cab. (Ed. 2), p. 617, pl. xciv. fig. 4.

"Shell subglobose, acuminate above, purplish-brown, rimated, striated with slender oblique lines of growth ; spire conoid, mammillated at the apex ; whorls $5\frac{1}{2}$, the two upper convex, smooth, the succeeding ones but very slightly convex, the last large, globose, slightly descending behind, but towards the aperture sub-ascending, showing behind the lip a deep pit, and being deeply excavated beneath the umbilical cleft ; aperture ear-shaped, slightly exceeding half the whole length ; peristome incrassate, expanded, reflexed, livid brown, the margins united by a callus more or less thick, the outer within in the middle furnished with a double white very prominent tooth, the columellar armed with a thick white penetrating fold.

"Length 23, diameter 16 mm.

"Distinguished by its globose form, colour, and the characters of the aperture. In form this species bears a striking resemblance to a shell from Fernando Noronha, described by the author under the name of *Bulinus* (*Tomigerus*) *ranneyi* (Journ. Linn. Soc., xx. p. 500, pl. xxx. fig. 8), and the armature of the aperture, although different, is of the same character.

"*B. isthmodon*, Martens, is smaller, differently coloured, and has a more oblique aperture, and the sculpture appears to be rather coarser."

Sokotra : Adho Dimellus (3500-4000 ft.).

One of the specimens from the above locality, in nice fresh condition, is light olivaceous brown, becoming somewhat purplish towards the apex. The suture exhibits a very fine white thread-like line, bordered below with a broader purplish line. The entire surface of the shell also is microscopically spirally closely striated, giving to it a somewhat dull silky appearance.

[Under roots of shrubs, and boulders. —H.O.F.]

8. *Buliminus* (*Passamaia*) *rotundus*, Smith. (Plate xiii. figs. 1, 4.)

Buliminus (*Passamaia*) *rotundus*, Smith, Journ. Malacol., vol. vi. p. 35, pl. v. fig. 4 ; Kobelt, Conch. Cab. (Ed. 2), p. 619, pl. xciv. fig. 6.

The following is my original description :—

"Shell globose, conoid superiorly, excavated inferiorly, very little rimated, white ; spire shortly conoid, submammillated at the apex ; whorls $5\frac{1}{2}$ slowly increasing, joined together by a moderately deep suture, the two upper convex, smooth, the following less convex, obliquely, very finely and closely costulated, the last globose, not descending in front, excavated in the umbilical region, and round the depression in front obtusely carinate, behind the lip deeply scrobiculate ; aperture irregularly ear-shaped, contracted ; peristome white, slender, the margins almost united at both ends by a conspicuous callus, the outer within in the middle produced and bidenticulated, the columellar reflexed, furnished with a slender penetrating fold, channelled at the insertion.

"Length 13, diameter 11·5 mm.

"Remarkable for its globular form, the fine costulation being finer than in *B. passamaianus*, the contracted, denticulate aperture, &c. The parietal callus is separated from the extremities of the peristome, both above and below, by a narrow groove or channel."

Sokotra : Homhil, East Sokotra (1500-2500 ft.).

The series of specimens obtained by Dr. Forbes and Mr. Grant shows that this species, hitherto known from a single specimen only, varies somewhat both in size and form. The largest example is 16 millim. in length, whereas the smallest is only 11. The difference in form chiefly relates to the greater elevation and acuteness of the spire. The form of the aperture, and the character of the peristome and the teeth within are very similar in all the specimens.

[Almost all obtained on the top of Gebel Matagoti under the roots of plants and shrubs.—*W.R.O.G.*]

9. **Buliminus** (*Passamaia*) **exodon**, *Martens*.

Buliminus exodon, Martens, Nachrbl. Deutsch. Malak. Ges., xiii. p. 136 (1881).

Pupa socotrana, Godwin-Austen, P.Z.S., 1881, p. 809, pl. lxxviii. fig. 13 ; Crosse, Op. cit. p. 345 ; Kobelt, Conch. Cab. (Ed. 2), pp. 619 and 621, pl. xciv. figs. 8, 9, 13 (non. fig. 7 = *B. bayleyi*).



(ENLARGED.)

Lieut.-Col. Godwin-Austen's original description is as follows:—

"Shell fusiform, oblate ; sculpture smooth, covered with pale umber epidermis ; spire with slightly convex sides ; suture shallow ; whorls 6 ; aperture elongately oval, subvertical ; peristome moderately thickened, slightly rimate on the middle of the outer margin, where there is a single rounded solid tooth ; columellar margin strong, perpendicular, with a well developed tooth.

"Major diameter 4·0, alt. axis 8·0, alt. apert. 3·5 mm."

Sokotra : Adho Dimellus (3500-4500 ft.).

[Found under stones.—*H.O.F.*]

10. **Buliminus** (*Achatinelloides*) **socotorensis**, *Pfeiffer*.

Bulimus (*Achatinelloides*) *socotorensis*, Godwin-Austen, P.Z.S., 1881, p. 802, pl. lxxviii. fig. 1.

Bulimus socotorensis, Pfeiffer, Zeitsch. f. Malak., ii. p. 157 (1845) ; Crosse, Op. cit. p. 347 ; Kobelt, Conch. Cab. (Ed. 2), p. 611, pl. xciii. figs. 5-6.



FIG. a.



FIG. b.



FIG. c.

(ENLARGED.)

"Shell dextral, rotundately oval, very closely and narrowly rimate; sculpture close regular ribbing; colour white, the last whorl ornamented with very oblique regular bands of madder-brown crossing the costulation at right angles, becoming broader and more irregular on the apical whorls but still very oblique; spire conical, apex sub-acuminate; suture shallow; whorls 5, rounded; aperture sub-oblique, oval, angular above, with a strong callus on the body whorl; peristome thin; the columellar margin flat, with a strong plication.

"Largest specimens: major diameter 7.0, alt. axis 10.1, alt. apert. 6.2 mm.

"Animal. Eye tentacles moderately long, the oral tentacles long and dark; animal pale coloured, foot pointed."—(*Godwin-Austen.*)

Sokotra: Dahamis (350-1000 ft.), and Dimichiro Valley.

[Estivating in large colonies on the stems of trees and bushes.—*H.O.F.*]

[This species is very common on trees (*Croton*, sp. ind.) on the plain of the valley at the mouth of which is the village of Gollonsir.—*B.B.*]

11. *Buliminus* (*Achatinelloides*) *dahamisensis*, *Smith*. (Plate xii. figs. 10, 14.)

Buliminus (Ocella) dahamisensis, *Smith*, Bull. Liverp. Muss., ii. p. 11.

Shell similar to the next species *B. homhilensis*, but differently coloured, whitish or greyish, with oblique brown stripes more or less irregular, which often in the penultimate and ultimate whorls are very dark, almost black. Some specimens have very little painting upon the body-whorl, which is of an uniform greyish tint. Having seen a good series of both, it seems to me advisable to consider them distinct species. These specimens in which the markings are very faint are very like the pale variety of *B. homhilensis*.

Sokotra: Hadibu Plain; Adho Dimellus (3500-4000 ft.); and Dahamis, (350-1000 ft.).

Some very pretty examples obtained by Mrs. Bent are smaller than the type, being only 13-14½ millim. in length instead of 18½.

[Estivating on stems of shrubs.—*H.O.F.*]

12. *Buliminus* (*Achatinelloides*) *homhilensis*, *Smith*. (Plate xii. fig. 13.)

Buliminus (Ocella) homhilensis, *Smith*, Bull. Liverp. Muss., ii. p. 11.

Shell narrowly perforated, ovate acuminate above, obliquely finely and closely costulated, dirty white or greyish blotched and striped with dark brown, the stripes in the last whorl being interrupted at the periphery, which is generally encircled with a pale zone. Below this the shell is painted with fine irregular lineation and punctulation of a lighter brown colour; whorls 7, slightly convex, divided by an almost horizontal suture; the two apical are pellucid, smooth, and shining, the last slightly ascending; aperture inversely ear-shaped, rich brown, often exceeding half the entire length of the shell; the outer lip is paler than the aperture, slightly thickened and faintly expanded;

columella expanded and reflexed above, white stained with brown, subdentate or plicate upon the inner edge.

A variety is almost entirely white, with the exception of a few scattered brown dots and some faint striping upon the upper part of the spire.

Length $19\frac{1}{2}$, diameter 11 mm.; aperture $10\frac{1}{2}$ long, 6 broad. A small specimen is 13 millim. long and 7 in width.

Hombil, 1500-2500 feet, and Dimichiro Valley.

Allied to *B. riebecki*, Martens, but shorter, more ovate, with a less produced spire and a wider and differently shaped mouth.

[Estivating in colonies on trees and shrubs.—H.O.F.]

13. Buliminus (Achatinelloides) lævior, Smith. (Plate xii. fig. 8.)

Buliminus (Orella) lævior, Smith, Bull. Liverp. Muss., ii. p. 11.

Shell perforate, ovate, white, striped with brown, the longitudinal stripes on the last whorl interrupted in the middle; below, the shell is ornamented with narrower oblique brown lines, almost smooth, striated with the oblique lines of growth; whorls 6-7, somewhat convex, the two apical pellucid, the last sub ascending; the aperture inversely ear-shaped, brown inside; the lip is white and not expanded; the columella white, marked with a brown spot, dilated, reflexed, plicate-dentate.

Length 14.0, diameter 9.6 mm.; aperture 9.0 mm., 4 broad.

Sokotra: Jena-gahan (1200-2500 ft.).

In form and colour very like *B. duhamisensis*, *hombilensis*, and *socotorensis*, but wanting the fine costulate sculpture of those species, the surface being almost smooth. The longitudinal colour-markings in the upper whorls are nearly upright, not oblique.

14. Buliminus (Achatinelloides) hadibuensis, Godwin-Austen.

Buliminus (Achatinelloides) hadibuensis, Godwin-Austen, P.Z.S., 1881, p. 803, pl. lxviii. figs. 3, 3a, 3b; Crosse, Op. cit. p. 350; Kobelt, Conch. Cab. (Ed. 2), p. 610, pl. xciii. figs. 2, 3.



FIG. a.

FIG. b.
(ENLARGED.)

FIG. c.

Lieut.-Col. Godwin-Austen's original description is as follows :—

“Shell elongately fusiform, rather broadly rimate in well-grown shells, closer in the younger specimens, coarse but regular costulation ; colour ochraceous-brown with streaks of madder-brown running parallel to the costulation, these again overlaid with minute specks of black, apex nearly black ; spire elongately pyramidal, slightly convex, sub-acuminate ; suture shallow, adpressed ; whorls 6, body whorl the largest, sides very flatly convex ; aperture ovate, more than half the length of the axis ; peristome with sharp edge, slightly reflected over the rimation, regularly curved on the outer margin ; columellar margin straight, with a slight sinuation within the aperture.

“Longest specimen 10·2, alt. axis 21·7, alt. apert. 12·5 mm. Shortest specimen 9 0, alt. axis 19·7, alt. apert. 11·2 mm.

“This shell is closely allied to *B. (Achatinelloides) balfouri*, Godwin Austen ; but it may be known at once by its more elongate form, coarser sculpture, and elaborate ornamentation.”

[“Most abundant on the trees upon the plain in the vicinity of Hadibu, on a *Croton*, being the commonest under-shrub.”—*B.B.*]

Sokotra : Dahamis (350-1000 ft.).

The varieties (Vars. *alba et minor*) mentioned by Godwin-Austen are, in my opinion, specifically distinct, and constitute the next species.

Two specimens of the present form were kept alive for some time. The animals were uniformly pale, excepting the eye-stalks. These in one specimen were slender, of a darkish tint, and slightly knobbed at the tips. In the other example they were semi-transparent white, and quite short and stumpy, having a very abnormal look.

[Abundant on trees, aestivating in immense colonies, strongly adfixed to the bark, often simulating its colour.—*H.O.F.*

Some of the largest colonies occupied an area of about two square feet, and must have included thousands of individuals of all ages, so closely approximated to one another that the stem of the tree was entirely concealed.—*W.R.O.G.*]

15. *Buliminus* (*Achatinelloides*) *mistus*, *sp. n.* (Plate xii. fig. 9.)

Buliminus (*Achatinelloides*) *hadibuensis*, vars. *alba et minor*, Godwin-Austen, P.Z.S., 1881, p. 804, pl. lxviii. fig. 4.



Shell elongate-ovate, pointed above, rimate, pale brownish, with longitudinal white streaks, which are interrupted at the periphery in the last whorl, obliquely finely costulate; whorls 7, regularly slowly increasing, the two uppermost smooth, convex, brownish, the rest slightly convex, with a somewhat oblique suture, the last slowly descending, roundly crested around the rimation; aperture inversely auriform, a little less than half the entire length, brownish within; peristome white, a trifle thickened, expanded, the margins joined by a thin callus, the columellar twisted or plicate within, and forming an obtuse angle with the basal edge.

Length 17·0, diameter 8·0 mm.; aperture 8·5 long, 5·0 broad.

Sokotra.—(*Balfour*.)

Quite distinct from *B. hadibuensis*. The form is different, the aperture being shorter in proportion to the whole length of the shell. The costulations are finer, sharper, and more numerous, the style of colouring is different, and the peristome, besides being white, is more expanded.

The shell upon which Godwin-Austen founded his var. *alba* of *B. hadibuensis* is merely a sun-bleached specimen of the present species. It is 4 millim. longer than the fresher specimen, which has been regarded as the Type.

16. Buliminus (Achatinelloides) **densicostulatus**, *sp. n.* (Plate xiii. fig. 10.)

Shell ovate-fusiform, rimate, white, with slightly oblique, very close-set, very fine, elevated striae; spire conical, with straight sides; whorls 7·8 slowly enlarging, separated by a nearly horizontal suture, the first two corneous, rounded, the rest flat, the last slightly angled at the middle, the angle gradually disappearing in front, not descending; aperture small, light brownish, inversely ear-shaped, less than half the entire length; peristome white at the edge, slightly thickened and brown within, the right margin not expanded, the columellar reflexed, in the middle conspicuously uniplicate within.

Length 18·0, diam. 9·0 mm.; aperture 8·0 long, 4·0 broad.

Sokotra.—(*Mrs. Bent*.)

Two specimens collected by Mrs. Bent. Very distinct on account of the conical spire, flat whorls, small aperture, and the excessively fine crowded costulations.

[This species was not obtained by us.—*H.O.F.*]

17. Buliminus (Achatinelloides) **balfouri**, *Godwin-Austen*.

Buliminus (Achatinelloides) *balfouri*, Godwin-Austen, P.Z.S., 1881, p. 804, pl. lxxviii. fig. 5, 5a.

Orella riebecki, Martens (part.), Kobelt, Conch. Cab. (Ed. 2), p. 612, pl. xciii. fig. 7.

Lieut.-Col. Godwin-Austen gives the following description of the type :—
 “Shell narrowly and deeply rimate, ovately fusiform, solid; sculpture



FIG. a. (ENLARGED.) FIG. b.

regular close oblique costulation; colour generally white, with a few dark distant longitudinal splashes on the four apical whorls; spire elongately conoid, sides convex, apex moderately sharp, suture shallow; whorls 7, last the largest, sides convex; aperture elongately ovate, nearly half the length of the shell, with a strong callus on the body-whorl in many specimens; peristome sharp, straight on the outer margin; columellar margin straight, reflected over the rimation, with a well-marked internal fold.

“Size: Longest specimen—major diameter 10·0, alt. axis 21·5, alt. apert. 10·0 mm. Shortest specimen—major diameter 9·5, alt. axis 17·8, alt. apert. 9·5 mm.

“Animal pale ochraceous with minute speckling of brown; tentacles pale, elongate, attenuate, pointed. In some the head is mottled dark olivaceous; no pallial line.”

[Not obtained by us.—H.O.F.]

Var. *elongata*, var. n. (Plate xii. fig. 11.)

Bulimius (Orella) theodore, Smith, Bull. Liverp. Muss., ii. No. 1, p. 12.

Shell fusiform-ovate, umbilicate, obliquely costulate-striated, white, painted with brown stripes and irregular spots: the stripes in the last whorl interrupted in the middle; adorned below with fine oblique brown lines; whorls 8 slowly increasing, somewhat convex, the two upper smooth, dirty white, the last slightly ascending in front; aperture narrow, deep brown, equalling half of the entire length of the shell; lip pale, hardly expanded; columellar white, tinged with brown inside, dentate-plicate, and reflexed.

Length 25·5, diameter 11·0 mm.; aperture 12·0 mm. long and 5·0 broad.

This form is allied to *B. riebecki*, Martens, but is more elongate, with higher whorls and a somewhat differently shaped aperture. The body whorl also is somewhat saccate.

Since the publication of the original description of *B. theodore* (Op. cit.) further study of the shells induces me to consider them merely as an elongate form of this species, which at present I am unable to unite with *B. riebecki*, as has been done by Martens and Crosse. In the

description the term "grossiuscule costulata" does not apply to *B. balfouri*, but would be applicable to *B. hadibuensis*. Can *B. riebecki* be a pale variety of that species? The figure given by Martens is certainly more like *hadibuensis* than the present species, and the description of the style of coloration, "maculis parvis ferrugineis vel griseis adpersa," agrees better with the former.

The animal of the var. *elongata* was of a dirty white colour, finely marbled with grey, darker above the head in front of the eye-tentacles, with a black streak extending backwards from each.

[This species was not obtained by us.—H.O.F.]

18. *Buliminus* (*Achatinelloides*) *riebecki*, Martens.

Buliminus riebecki, Martens, Nachrbl. Deutsch. Malak. Ges., xiii. p. 137 (1881); Crosse, Op. cit. p. 349; Kobelt, Conch. Cab. (Ed. 2), p. 612, pl. xciii. figs. 12, 13.

The original description may thus be translated:—

Shell ovate-oblong, rimate, rather coarsely costulated, whitish, with scattered small reddish or greyish spots; whorls 7, regularly increasing, with a moderately impressed suture, the first smooth, small, the last attenuate below the middle; the aperture occupying half the shell, narrowly ovate; peristome thickened, outer margin much curved above, then straight, the basal somewhat expanded, sharply curved, the columellar dilated above.

Length 19, diameter 10 mm.; aperture 10 long, 5·5 broad.

Sokotra: Wadi Kischen (at 1000 metres).—(Martens.)

Not obtained by Mr. Grant and Dr. Forbes, unless this species proves to be a form of *B. hadibuensis*. Distinct from *B. (Achatinelloides) balfouri* of Godwin-Austen.

19. *Buliminus* (*Achatinelloides*) *gollonsirensis*, Godwin-Austen.

Buliminus gollonsirensis, Godwin-Austen, P.Z.S., 1881, p. 805, pl. lxix. fig. 10; Crosse, Op. cit. p. 350; Kobelt, Conch. Cab. (Ed. 2), p. 609, pl. xciii. fig. 1.



(ENLARGED.)

The following is Lieut. Col. Godwin-Austen's original description :—

“Shell ovately fusiform, narrowly rimate, solid; sculpture regular, rather pronounced costulation; colour white or pale buff, minutely mottled with brown, with very irregular, jaggy, transverse, short streaks or patches of darker brown, slightly oblique to the costulation, which do not reach to the suture above; spire elongately pyramidal, sides flatly convex, apex subacuminate, suture shallow; whorls 7, sides flat; aperture ovate, considerably more than one-third the length of the axis; peristome sharp, flatly convex on the outer margin and rounded below; columellar margin reflected, nearly covering the rimation, with an internal fold.

“Longest specimen—major diameter 7·3, alt. axis 16·8, alt. apert. 8·0 mm. Shortest specimen—major diameter 5·5, alt. axis 13·0, alt. apert. 6·8 mm.”

[“On trees, not uncommon on hill slopes, these are from those bounding the Gollonsir Valley.”—*B.B.*]

[This species was not obtained by us.—*H.O.F.*]

20. *Buliminus* (*Achatinelloides*) *longiformis*, *Godwin-Austen*.

Buliminus (*Achatinelloides*) *longiformis*, Godwin-Austen, P.Z.S., 1881, p. 806, pl. lxxviii. fig. 8; Crosse, Op. cit. p. 351; Kobelt, Conch. Cab. (Ed. 2), p. 614, pl. xciii. fig. 10.



(ENLARGED.)

The following is the original description of the species given by Lieut.-Col. Godwin-Austen :—

“Shell very narrowly rimate, polished, solid, very elongately fusiform; sculpture indistinct transverse striæ; colour white, with elongate more or less dark-brown streaks of colour extending to apex, less defined on basal end; spire elongately pyramidal, sides flatly convex; suture shallow; whorls 7, sides flat; aperture ovate, rather more than half the length of the axis; peristome sharp on the outer margin which is slightly convex; columellar margin rather thickened, almost concealing the rimation, with an internal fold.

“Longest specimen—major diameter 7·2, alt. axis 19·5, alt. apert. 8·0 mm. Medium specimen—major diameter 6·9, alt. axis 17·0, alt. apert. 7·5 mm.”

Sokotra: Homhil (1500-2500 ft.).

This and the preceding species are very closely related, differing only in colour markings. *B. longiformis* varies in size, some specimens being 20 millim. long, whilst others, equally adult, are only 14. The number of the whorls ranges from $6\frac{1}{2}$ to $8\frac{1}{2}$.

[In the crevices of the limestone rocks, and under stones and the roots of plants on the top of Matagoti.—H.O.F.]

21. **Buliminus** (*Achatinelloides*) **tigris**, *Godwin-Austen*.

Buliminus (*Achatinelloides*) *tigris*, Godwin-Austen, P.Z.S. 1881, p. 805, pl. lxviii. fig. 6; Crosse, Op. cit. p. 348; Kobelt, Conch. Cab. (Ed. 2), p. 611, pl. xciii. fig. 4.



(ENLARGED.)

Lieut.-Col. Godwin-Austen gives the following description of the type:—

“Shell rimate, ovately fusiform, solid, smooth and polished; sculpture, lines of striae discernible under lens; colour white and buff-brown, streaked diagonally below with narrow bands of brown; above, each whorl ornamented with jagged regularly disposed transverse bands of the same colour; spire elongately pyramidal, sides slightly convex; suture shallow; whorls 6, sides slightly convex; aperture oval, sub-vertical; peristome thick, regularly convex on the outer margin; columellar margin with a strong plication, very little reflected.

“Longest specimen—major diameter 6·0, alt. axis 12·5, alt. apert. 5·7 mm. Shortest specimen—major diameter 5·5, alt. axis 10·8, alt. apert. 4·5 mm.”

[Taken on stems of *Dracena* on limestone at altitudes of 2000 feet.—*B.B.*]

Very near *B. longiformis* and *gollonsirensis*, but shorter, with slightly more rounded whorls, and a more open umbilical fissure.

[This species was not met with by us.—H.O.F.]

22. **Buliminus** (*Achatinelloides*) **zebrinus**, *Godwin-Austen*.

Buliminus (*Orella*) *zebrinus*, Godwin-Austen, P.Z.S., 1881, p. 806, pl. lxviii. fig. 7; Crosse, Op. cit. p. 348.

Lieut.-Col. Godwin-Austen thus describes the type specimen of this species :—

“Shell rimate, elongately fusiform, polished, solid : sculpture indistinct



(ENLARGED.)

transverse striae under lens ; colour milky white, with fine well-defined spiral bands of madder-brown on the last whorl, which near the suture turn sharply and change to a dark ochre tint ; the dark bands are more irregular and jagged towards the apex ; spire elongately pyramidal, very slightly convex ; suture shallow ; whorls $6\frac{1}{2}$, sides somewhat flattened ; aperture subvertical ; peristome thickened ; columellar margin with a slight fold.

“Longest specimen—major diameter 5·0, alt. axis 10·8, alt. apert. 5·2 mm.

Shortest specimen—major diameter 4·0, alt. axis 9·4, alt. apert. 4·0 mm.”

[On the stems of *Dracena* on limestone at over 2000 feet with *B. tigris*.—*B.B.*]

A smooth species, with very remarkable colour markings, of a perfectly different form to *B. socotorensis*, with which it is compared by M. Crosse.

[This species was not observed by us.—*H.O.F.*]

23. *Buliminus* (*Achatinelloides*) *acutus*, *Smith*. (Plate xii. fig. 7.)

Buliminus (*Orella*) *acutus*, *Smith*, *Journ. Malacol.*, vol. vi. p. 36, pl. v. fig. 5 ; *Kobelt, Conch. Cab.* (Ed. 2), p. 614, pl. xciii. fig. 9.

Shell ovately fusiform, narrowly perforate, shining, black and brown horn-colour, ornamented with white longitudinal, narrow, irregular stripes which, below the middle of the last whorl are oblique, sculptured with scarcely perceptible lines of growth ; spire elongately pyramidal, obtuse at the apex ; whorls 7 slowly increasing, the two superior yellowish, convex, the rest rather flat, the last not descending, subacuminate in front ; aperture narrowly oval, deep brown inside, a little over one-third of the entire length of the shell ; peristome yellowish, somewhat thin, with the external margin not expanded, the columellar narrowly reflexed, white at the insertion, slenderly uniplicate in the middle within.

Length 13·0, diameter 5·4 mm. ; aperture 5·0 mm. long, 2·5 broad.

Sokotra = (*Mrs. Bent.*)

The acuminate spire, flattened whorls, and style of colouring are the distinguishing features of this pretty species. The ground colour of the last whorl is lighter than that of the two preceding whorls, and, besides the irregular white lines and stripes, a few white dots are scattered irregularly over the surface. The shell is very smooth and glossy, and the embryonic shell consists of two convex whorls of a yellowish horn colour. Allied to *B. longiformis*, Godwin-Austen, but smaller, with a more acuminate spire, and with slightly more convex whorls, a larger umbilical perforation and oblique basal colour-markings.

[This species was not obtained by us.—*H.O.F.*]

24. *Buliminus* (*Achatinelloides*) *semicastaneus*, Godwin-Austen.

Buliminus (*Achatinelloides*) *semicastaneus*, Godwin-Austen, P.Z.S., 1881, p. 807, pl. lxviii. figs. 9, 10; Crosse, Op. cit. p. 349; Kobelt, Conch. Cab. (Ed. 2), p. 613, pl. xciii. fig. 8.



FIG. a.

(ENLARGED).



FIG. b—*Var. ALBA*, G.A.

Col. Godwin-Austen gives the following description of the Type:—

Shell rimate, solid, fusiform; sculpture fine oblique striation, to the naked eye polished; colour milky white on last two whorls, chestnut or sienna-brown on the five apical; spire elongately pyramidal, becoming rapidly extenuate at the apex, sides convex; suture rather shallow; whorls 7, body-whorl tumid, side convex; aperture ovate, sub-oblique; peristome continuous as a strong callus on the body-whorl, rather flattened on the outer margin; columellar margin with well-marked fold, oblique, somewhat thickened and angulate near the upper inner margin.

“Longest specimen—major diameter 5·5, alt. apert. 5·5, alt. axis 10·0 mm.

Shortest specimen—major diameter 5·5, alt. apert. 5·5, alt. axis 9·5 mm.”

[South side of the island on limestone rocks, nearly 1000 feet. Nine specimens were found.—*B.B.*]

Sokotra: Adho Dimellus (3500-4500 ft.).

I do not feel at all convinced that the shells, considered by Godwin-Austen as *B. (Achatinelloides) semicastaneus*, var. *alba*, really belong to this species. They have flatter whorls, and consequently a less impressed suture, and the labrum appears to be less thickened.

The two specimens in the British Museum—one of them (see fig. b., p. 127), that figured by Godwin-Austen, P.Z.S., 1881, pl. lxviii. fig. 10—are both dead bleached shells.

The single specimen obtained by Dr. Forbes and Mr. Grant at the above locality is uniformly brown, and has a slightly thinner outer lip than the type, and seems to have relationship to *B. adonensis*.

25. *Buliminus* (Achatinelloides) *innocens*, Smith.

Buliminus (*Orella*) *innocens*, Smith, Journ. Malacol., vol. vi. p. 36, pl. v. fig. 6; Kobelt, Conch. Cab. (Ed. 2), p. 615, pl. xciii. fig. 11.

*



(ENLARGED.)

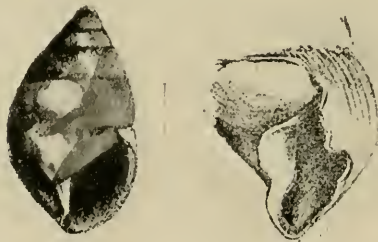
Shell small, narrow, ovately fusiform, rimated, white; whorls 7, gently increasing, the two apical smooth, convex, the rest flattish, striated with oblique and closely set costulae, separated by a slightly oblique, distinct, suture, the last not descending; aperture small, narrow, a little exceeding one-third the whole length of the shell, white; peristome thin, the outer margin hardly expanded, the columellar slightly reflexed, furnished within with a slender oblique fold.

Length 12.0, diameter 4.0 mm.; apert. 4.0 mm. long, 2.0 broad.

Two dead specimens collected by Mrs. Bent are all that are known of this species, which may be recognised by its slender form, and very fine, close-set costulae.

26. *Buliminus* (Achatinelloides) *adonensis*, Godwin-Austen. (Plate xiii. fig. 11.)

Buliminus (*Pachnodus*) *adonensis*, Godwin & Austen, P.Z.S., 1881, p. 808, pl. lxix. figs. 9, 9a; Kobelt, Conch. Cab. (Ed. 2), p. 641, pl. xcvii. fig. 13.



(ENLARGED.)

Lieut.-Col. Godwin-Austen gave the following description of the Type :—

“Shell dextral, ovately fusiform, thin, semi-transparent : sculpture under high power, epidermis rough with a few irregular transverse ridges ; colour olive-brown ; spire elongate, sides flatly convex ; apex blunt, suture well marked ; whorls 6, sides rather flat ; aperture oval, oblique ; peristome thin ; columellar margin flat, triangular, with a slight curve or twist.

“Size—major diameter 9·5, alt. axis 8·5 mm.”

[From under granite boulders, hills above Adouma, over 2000 feet.—*B.B.*]

The above description has, however, been founded upon immature specimens. An adult shell collected by Mrs. Bent shows that the species is closely related to *B. semicastaneus*. It is a very small form, consisting of six slightly convex (not “rather flat”) whorls, narrowly marginate beneath the suture. The aperture is inversely auriform, the peristome thin, but a little expanded, the columella margin being broadly dilated, with a prominent fold on the inner edge.

[This species was not obtained by us,—*H.O.F.*]

27. **Buliminus (Pachnodus) fragilis**, Godwin-Austen. (Plate xiii. fig. 13.)

Buliminus (Pachnodus) fragilis, Godwin-Austen, P.Z.S., 1881, p. 808, pl. lxx. fig. 8 ; Kobelt, Conch. Cab. (Ed. 2), p. 640, pl. xevii. fig. 11.



(ENLARGED.)

Lieut.-Col. Godwin-Austen gives the following description of the Type :—

“Shell dextral, narrowly rimate, obtusely pyriform, very thin ; sculpture fine irregular transverse lines of growth ; colour olive-green ; spire pyramidal, sides flat, apex sharp, tapering rapidly, suture moderate ; whorls 5, sides flat, last whorl large : aperture oblique, ovate ; peristome thin ; columellar margin straight, thin and reflexed.

“Major diameter 4·7, alt. axis 7·5, alt. apert. 3·2 mm.”

[From under granite boulders, hills above Adouma, over 2000 feet.—*B.B.*]

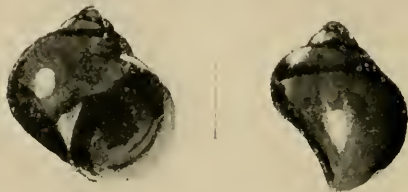
Sokotra : Adho Dimellus (3500-4500 ft.).

A single specimen was obtained at this locality, and is now in the Lord Derby Museum, Liverpool. Some examples received from Mrs. Bent are much larger than the Type, which is merely a half-grown shell.

They have an additional whorl, and are 11 millim. in length. The whorls, although described as flat, are in reality slightly convex, as shown in the figure above from the P.Z.S., 1881, pl. lxix. fig. 8.

28. *Buliminus* (*Pachnodus*) *heliciformis*, *Godwin-Austen*.

Buliminus heliciformis, Godwin-Austen, P.Z.S., 1881, p. 807, pl. lxix. figs. 7, 7a; Crosse, p. 351; Kobelt, Conch. Cab. (Ed. 2), p. 640, pl. xevii. fig. 12.



(ENLARGED.)

The single specimen upon which this species was founded is evidently only the young state of a shell, which may not even belong to the genus *Buliminus*.

[The occurrence of the following species in Sokotra requires confirmation :—

(a) ***Buliminus candidus* (*Lamarck*).**

Pupa candida, Lamarck; Anim. S. Vert., vi. part 2, p. 106 (1822); Crosse, Op. cit. p. 352.

Arabia.

(b) ***Buliminus labiosus* (*Müller*).**

Helix labiosus, Müller, Verm. Hist., ii. p. 96 (1774); Crosse, Op. cit. p. 353.

Arabia. (Küster and Brit. Mus.)

Reported also from C. Guardafui.

(c) ***Buliminus prochilus*, *Bourg*.**

Bulimus prochilus, Bourguignat, in Révoil, Voy. Comalis, Moll., p. 18, pl. ii. fig. 21 (1882); Crosse, Op. cit. p. 353.

Probably Arabian.

(d) ***Buliminus albatu*s, *Férus*.**

Helix albata, Férussac. Mss. Pfeiffer, Symbolæ, ii. p. 42.

Bulimus bicinctus, Récluz., Revue Zool., 1843, p. 4.

Bulimus candidissimus, Pfr., Malak. Bl., v. p. 239 (1858); Crosse, Op. cit. p. 352; Kobelt, Conch. Cab. (Ed. 2), p. 615, pl. xciii. figs. 14, 15.

Arabia.

B. bicinctus and *B. candidissimus* were both described as Sokotran species.

The latter was founded upon young specimens of the unbanded variety of *B. albatu*s.

(e) **Buliminus contiguus**, *Reeve*.

Buliminus contiguus, Reeve, Conch. Icon. v. *Bulimus*, 582 (1849) ; Crosse, Op. cit. p. 353.

Abd-el-Kuri.

(f) **Buliminus artufelianus**, *Ancey*. (Plate xiii. fig. 19.)

Buliminus artufelianus, Ancey, Crosse, Op. cit. p. 348.

Although the locality of this species is not known with certainty, there seems a strong probability that it is either Sokotra or Abd-el-Kuri, judging from the great resemblance the shell bears to certain forms from these islands. It is not at all related to *B. socotorensis*, to which species M. Crosse relegated it, as a variety. It is much more nearly allied to *B. fusco-apicata*, Smith, from Abd-el-Kuri. In coloration it is almost identical, but differs in general form, in having more convex whorls, and in being much more finely striated. I am enabled to note these differences through a comparison of the unique type kindly lent me by Mons. Ancey.]

STENOGYRIDÆ.**Stenogyra**, *Shuttleworth*.29. **Stenogyra** (*Riebeckia*) **sokotorana** (*Martens*). (Plate xiii. fig. 15—a young shell.)

Stenogyra fumifcata, Godwin-Austen, P.Z.S., 1881, p. 810, pl. lxix. figs 2, 2a ; Crosse, Op. cit. p. 354.

Achatina sokotorana, Martens, Nachr. Mal. Ges., xiii. p. 135 (1881).



FIG. a.

FIG. b.

Lieut.-Col. Godwin-Austen gives the following description of the Type of *S. fumifcata*, obtained by Professor Balfour:—

“Shell dextral, elongately turreted, solid, not rimate: sculpture irregular-sized fine transverse lines of growth crossed by spiral lines, giving a cloth-like appearance: colour ruddy ochre: spire elongate, sides convex: apex contracting rather rapidly at the sixth whorl, rounded: suture shallow, but well marked; whorls 11, regular, flat-sided: aperture semioval, angular above, rounded below, nearly vertical: peristome thin, columellar margin strong, simple, slightly curved inwards at base.

“Size: major diameter 18·5, alt. apert. 17·5, alt. axis, 59·0 mm.”

[Common on limestone at east end of island. This shell is used often by the natives for a pipe bowl.—*B.B.*]

“This is a remarkable form, also with characters somewhat like *Bacillum*, and may eventually be placed in a sub-genus of its own next it and *Prosopæus*.”

Sokotra: Dahamis.

In this species the apex is large, and the suture, especially in the upper whorls, is distinctly channelled.

[In the ground (often deeply buried), almost always dead, in enormous numbers together, under ledges of rock.—*H.O.F.*]

30. *Stenogyra* (Riebeckia) *decipiens*, Smith. (Plate xiii. fig. 14—a young shell.)

Stenogyra (Riebeckia) *decipiens*, Smith, Journ. Malacol., vol. vi. p. 37.

“Shell similar to that of *S. sokotorana*, but more attenuated at the apex: suture not channelled: sculpture finer and not cancellated.

“Length, 88·0, diameter 30·0 mm.: apert. 27·0 mm. long.

“Length 78·0, diameter 25·0 mm.: apert. 22·0 mm. long.”

Sokotra: Adho Dimellus (3500-4000 ft).

Larger than *S. sokotorana*. “Although quite similar in general appearance,” as I have stated in the *Journal of Malacology* (loc. cit.), “this species is certainly distinct from *S. sokotorana*. The top of the spire is more slender, the suture is not deeply cut or channelled, and the sculpture is much finer, consisting of fine lines of growth and excessively fine spiral striæ. It is possible that some of the shells figured by Martens (*Conch. Mittheil.* vol. ii. pl. xxix.) may belong to this species, figs. 7a, 7b, and 8 especially having a very striking resemblance to it.”

[Under ground at the base of high granite cliffs.—*H.O.F.*]

31. *Stenogyra* (Riebeckia) *gollonsirensis*, Godwin-Austen. (Plate xiii. fig. 12.)

Stenogyra gollonsirensis, Godwin-Austen, P.Z.S., 1881, p. 809, pl. lxxix. fig. 1; Crosse, Op. cit. p. 355.

Lieut.-Col. Godwin-Austen gives the following description of the Type specimen, collected by Professor Balfour :—

“ Shell dextral, elongately turreted ; sculpture smooth, with shallow lines



of growth ; colour dull white ; spire turreted, apex rounded, solid ; suture moderately impressed ; whorls 12, sides very slightly convex ; aperture fusiform ; peristome thin ; columellar margin solid, straight and scarcely reflected.

“ Size : major diameter 18·2, alt. axis 61·8, diameter apert. 9·2, alt. apert. 14·3 mm.”

[On limestone at an altitude of 1000 feet on the top of the ridge overlooking Gollonsir village, and on the south-west of it ; not abundant in this locality.—*B.B.*]

“ In the form of its aperture this shell approaches the sub-genus *Bacillum* of Theobald from Eastern India.”

Sokotra : Hombil (1500-2500 ft.).

This species is about the same size as *S. sokotorana*, but differs in form and sculpture. The body whorl is very much shorter and the other whorls higher than in that species. In fresh specimens the sculpture consists of fine lines of growth, crossed by excessively fine crowded spiral striae, giving the surface a subgranular textured appearance. The epidermis is yellowish olive, interrupted at the middle of the body-whorl, so that the lower half is whitish. Here and there occur a few brown streaks in the direction of the lines of growth. The

Type of the species is a dead bleached shell which has lost most of the surface sculpture through exposure to the weather.

[Under roots of bushes on the top of Hamaderu.—*H.O.F.*]

32. *Stenogyra* (*Riebeckia*) *adonensis*, *Godwin-Austen*.

Stenogyra adonensis, Godwin-Austen, P.Z.S., 1881, p. 810, pl. lxix. figs. 4, 4a : Crosse, Op. cit. p. 356.

Stenogyra socotorana, Martens, Conch. Mittheil. Vol. II. p. 149, pl. xxviii. figs. 14, 16.



FIG. a.

(ENLARGED.)

FIG. b.

Lieut.-Col. Godwin-Austen gives the following description of the Type of the species :—

“Shell not rimate, dextral, elongately turreted, glassy, polished ; a few faint longitudinal shallow lines of growth ; colour very pale ochraceous ; spire high, sides slightly convex ; apex blunt, rounded and rather rapidly tapering at the fifth whorl ; suture shallow, adpressed ; whorls 10, somewhat convex ; aperture elongately oval, subvertical ; peristome thin, columellar margin thin, straight.

“Size : major diameter 8·5, alt. axis 24·8, alt. apert. 7·0 mm.”

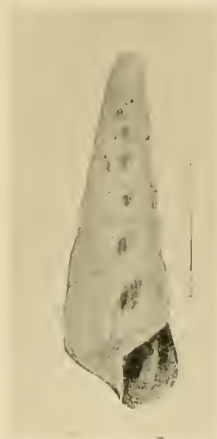
Sokotra : Adho Dimellus (3500-4500 ft.) ; also Hombil (1500-500 ft.).

This species varies considerably in stoutness, some examples being much more slender than others. The type is 25 millim. long and $8\frac{1}{2}$ broad. A narrower specimen is 26 long and $7\frac{1}{2}$ broad, whereas the broadest example is $23\frac{1}{2}$ long and 9 in diameter. Although the extreme forms have a very dissimilar look, they appear to be connected by the intermediate links occurring in the series of the specimens examined.

A comparison of a typical specimen of *S. sokotorana* kindly submitted by Professor E. von Martens, proves that that species is identical with the present and not with *S. enodis*, as he originally supposed. The latter, the Type of which was a very young shell, is a very much more slender form altogether, and of a pellucid white colour, the present species being greenish yellow.

33. **Stenogyra** (Riebeckia) **enodis**, *Godwin-Austen*. (Plate xiii. fig. 16.)

Stenogyra (Subulina ?) *enodis*, Godwin-Austen, P.Z.S., 1881, p. 811, pl. lxi. fig. 5 ; Crosse, p. 355.



(ENLARGED.)

The following is the original description of this species given by Lient.-Col. Godwin-Austen :—

“Shell dextral, elongately turreted, not rimate, very thin, glassy, diaphanous ; no sculpture ; colour milky-white ; spire long, apex blunt and rounded, suture moderately deep ; whorls 9, sides convex, regularly increasing ; aperture quadrate, subvertical (not fully formed) ; peristome thin ; columellar margin straight, vertical.

“Size : major diameter 4·0, alt. axis 13·0, alt. apert. 2·8 mm.”

Sokotra : Jena-agahan (1200-2500 ft.).

The unique type, being a very young shell, gives only a poor idea of this interesting species. The largest specimen examined consists of 15 whorls, and is 37 millim. in length and 8 in diameter. The aperture is inversely auriform, and the columella a little thickened and arcuate, and exhibits a slight anterior truncation. The last whorl is rounded at the periphery.

[Under stones on Gebel Fedehen.—H.O.F.]

34. *Stenogyra* (Riebeckia) *insculpta*, Smith.*Stenogyra insculpta*, Smith, Journ. Malacol., vi. p. 37, pl. v. fig. 7.

*



(ENLARGED.)

"Shell subulate, imperforate, white; whorls 15, very gently increasing, separated by a deep oblique suture, the two apical smooth, convex, tabulate above, forming an obtuse apex, the following 5-6 somewhat convex, the rest less convex, flattish, sculptured with slightly oblique striae, close and peculiarly crenulated, the last angulated at the periphery, not descending; aperture angularly oval: peristome slender, simple: columellar margin narrowly reflexed.

"Length 37·0, diameter 6·0 mm.; aperture 5·0 mm. long and 3 broad.

"This species is remarkable for the peculiar sculpture, consisting of close-set slightly oblique raised lines of growth, which being crossed by numerous transverse impressed striae, have a prettily festooned or crenulated appearance. It differs from *S. arguta*, Martens, in sculpture, in the angulation of the body-whorl and more tapering form."

Collected by Mrs. Bent, but not found by Dr. Forbes and Mr. Grant.

35. *Stenogyra* (Riebeckia) *arguta*, Martens.

Stenogyra arguta, Martens, Nachrbl. Deutsch. Malak. Ges., xiii. p. 138 (1881).

Stenogyra jessica, Godwin-Austen, P.Z.S., 1881, p. 810, pl. lxi. fig. 3.

Stenogyra (*Opeas*?) *hirsutus*, Godwin-Austen, P.Z.S., 1881, p. 811, pl. lxi. figs. 6, 6a; Crosse, Op. cit. p. 356.

The following is the description given by Godwin-Austen of the typical specimen of *Stenogyra hirsutus*:—

“Shell dextral, elongately turreted, scarcely rimate, covered with a thick

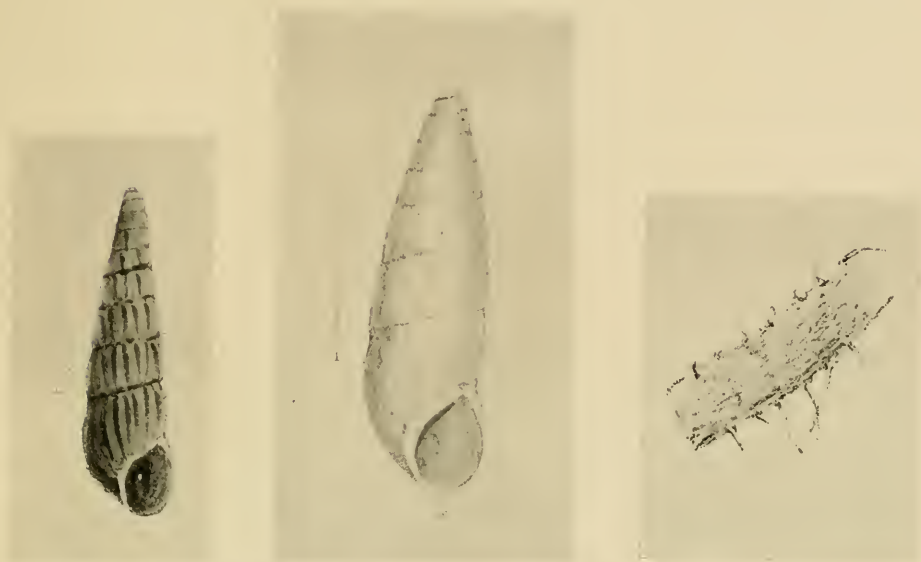


FIG. b. (*S. HIRSUTUS*, G.-A.)

FIG. a. (*S. JESSICA*, G.-A.)

FIG. c.

(ENLARGED.)

epidermis : sculpture a rough surface with regularly disposed longitudinal lines of fine hairs (Fig. c) ; colour dull ochre ; spire elongate, sides flat, apex blunt, suture well impressed ; whorls 11, sides slightly convex : aperture oval, oblique ; peristome thin : columellar margin thin, slightly reflected.

“Size : major diameter 3.0, alt. axis 11.0, alt. apert. 2.0 mm.”

Sokotra : Hadibu Plain ; Adho Dimellus (3500-4500 ft.), ; Homhil (1500-2500 ft.).

After carefully examining the Types of *S. jessica* and *S. hirsutus*, and the series of specimens obtained by Dr. Forbes and Mr. Grant, I feel convinced that only one species is represented. The types of *S. jessica* are worn bleached shells which have lost the “hairs” retained by *S. hirsutus*, the unique type of which is merely a very young shell, but in fresh condition. This was commented upon by Martens when describing his *S. arguta*. Specimens vary somewhat in form, some being longer and more slender than others. The largest specimen examined is 23 millim. long and 6 broad. A shorter example is 17 in length and $5\frac{1}{2}$ in diameter. One of the specimens from Homhil is

in perfect condition, being clothed with a beautiful hairy periostracum, the "hairs" being arranged in rows upon the lines of growth, and longer than in the Type.

POMATIIDÆ.

Otopoma, Gray.

36. *Otopoma naticoides* (Récluz).

Cyclostoma naticoides, Récluz, Rev. Zool., 1843, p. 3.

Otopoma naticoides, Godwin-Austen, P.Z.S., 1881, p. 252, pl. xxvii. figs. 1, 1a, 1b; Crosse, Op. cit. p. 361; Godwin-Austen, Moll. India, vol. ii. p. 29, pl. lxvii. figs. 1, 5a (anatomy and *radula*).

Georgina austeni, Bourguignat, in Révoil's Voy. pays Comalis, Moll., p. 68 (1882).

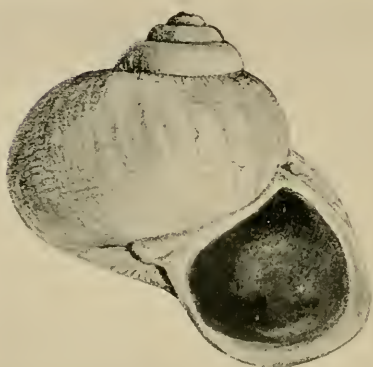


FIG. a.

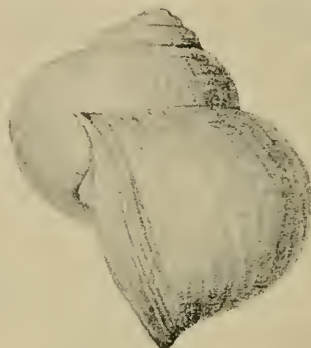


FIG. b.



FIG. c.

Col. Godwin-Austen thus describes a specimen obtained by Professor Balfour :—

"Shell globosely turbate, very solid; sculpture well marked transverse irregular lines of growth crossed by distant indistinct spiral sulcation; colour white, fine orange within the aperture; spire rather high, the extreme apex generally decollate; whorls 5, well rounded; aperture

obliquely and broadly ovate, angular above, suboblique; peristome thick and solid, particularly on columellar margin, where it spreads out and completely conceals the umbilicus; this is a greater development and exaggeration of the angulate notch which is to be seen in *O. balfouri* (G.-A.) and *O. complanatum* (G.-A.); operculum (fig. c): situated well within the aperture, flatly concave in front, shelly, smooth, of about $3\frac{1}{2}$ whorls, nucleus subcentral.

"Size of largest specimen: major diameter 59.5, alt. axis 31.5."

[Balfour, Riebeck, and Schweinfurth obtained this species.]

37. *Otopoma balfouri*, *Godwin-Austen*.

Otopoma balfouri, Godwin-Austen, P.Z.S., 1881, p. 253, pl. xxvii. figs. 2, 2a: Crosse, Op. cit. p. 362.

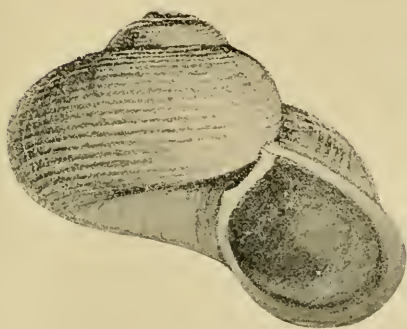


FIG. a.



FIG. b.

Godwin-Austen has given the following description of the Type:—

"Shell globosely turbinate, solid, very openly umbilicated, ribbed regularly and spirally throughout; but the ribbing does not extend within the umbilicus; colour white; spire pyramidal, decollate usually for $1\frac{1}{2}$ whorls; suture well impressed; whorls 4, well rounded; aperture subvertical, ovoid, angular above; peristome continuous, solid, and reflected slightly on the outer margin, less solid on the columellar side, which presents a slight dentation with angularity just below the upper inner margin, well rounded below.

"Size: major diameter 55.0, minor diameter 40.0, alt. axis 22.0 mm.

"Dwarf variety—major diameter 32.8, minor diameter 26.5, alt. axis 14.0 mm."

[Common on the land towards the east end of the island; this portion is elevated over 700 feet, and is of limestone. — B.B.]

[This species was not met with by us. — H.O.F.]

38. *Otopoma complanatum*, Godwin-Austen. (Plate xii. figs 4, 5.)

Otopoma complanatum, Godwin-Austen. P.Z.S. 1881, p. 254, pl. xxvii. figs. 3. 3a : Crosse, Op. cit. p. 362.

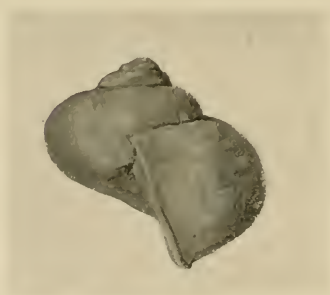


FIG. a.



FIG. b.

Lieut.-Col. Godwin-Austen gives the following description of the Type :—

“Shell turritate, openly umbilicated, fine spiral ribbing, crossed by transverse finer ribbing, smooth on base; colour white; spire pyramidal : $1\frac{1}{2}$ whorls at the apex smooth; suture impressed; whorls 5, sides well rounded; aperture ovate, sub-oblique, angular above; peristome continuous, thickened and scarcely reflected on the outer margin, which is well rounded; columellar margin oblique to axis, thin, with a well marked submedian angulation near the umbilicus, but with no tendency to an expansion in that direction.

“Size : major diameter 36·8, minor diameter 29·5, alt. axis 16·8 mm.”

Sokotra : Dahamis (350-1000 ft.); Jena-agahan (1200-2500 ft.); and Hadibu Plain.

The Types described, being devoid of colour, give no idea of the ornamentation of this fine species, nor do they show the great variation in size which it exhibits. The largest example from Jena-agahan (fig. 5) is 43 mm. in its greatest width, whereas the smallest and equally adult specimen from Dahamis is only 25. The prevailing colour is purplish, with numerous spiral dark zones and lines, except at the lower surface, which is paler and unbanded. A light zone almost invariably marks the periphery. One specimen (fig. 4) is of a uniform bright reddish tint above, a little paler beneath, and without any spiral lineation whatever. Another example, of the same tint, has a single blackish line around the body-whorl, a little above the middle. The sculpture of this species is also somewhat variable. In some specimens the decussated sculpture of the spire is continued upon the body-whorl, whilst in others this volution is smoother. Some examples also show more malleation than others, and this feature, although not referred to by Godwin-Austen, is present in both specimens which he examined. The interior of the aperture in coloured specimens exhibits the external coloration, but intensified. A distinguishing feature of this species, besides the open perspective umbilicus, is the short dentiform prominence upon the columellar margin reflexed

towards the umbilicus. The thickened peristome is generally whitish or cream-coloured, but in some very dark examples it is orange.
[Under bushes. — *H.O.F.*]

39. *Otopoma socotranum*, Bourguignat. (Plate xii. fig. 6.)

Otopoma socotranum, Bourguignat, Révoil's Voy. pays Comalis, Moll., p. 64 (1882).

Otopoma clathratulum, var. *socotrana*, Godwin-Austen, P.Z.S., 1881, p. 254, pl. xxvii. 4, 4a; Crosse, Op. cit. p. 363.



FIG. a.

FIG. b.

The following is Col. Godwin-Austen's description :—

“Shell very globosely turbinate, closely umbilicated, spiral ribbing on the apical whorls crossed by transverse striation, becoming smoother on the body whorl, which only shows the latter: colour white, also pale purple, stronger on the apex; bordering the suture in one specimen numerous pale purple bands of colour occur, showing darkish above the periphery (fig. 4a); spire pyramidal; suture impressed; whorls 4, well rounded; aperture subvertical, oval, angulate above; peristome continuous, almost separated from the penultimate whorl, but reflected, thickened on the outer margin; columellar margin sub-oblique, nearly straight with only a very slight tendency to angulation; operculum shelly, situated close to the peristome, paucispiral, of three whorls rapidly increasing, nucleus subcentral, flat in front.

“Size: major diameter 28·5, minor diameter 22·6, alt. axis 13·5.”

This species is much more closely related to *O. complanatum* than to *clathratulum*, as Godwin-Austen considered, and seems to be rather distinct. It has a more contracted umbilicus than *complanatum*, through the body-whorl being more tightly coiled, and more raised spire, and none of the four specimens examined exhibit the short dentiform prominence upon the columellar margin which occurs in that species. The body-whorl is almost smooth anteriorly. The two specimens which were described by Godwin-Austen were both more or less faded. Four fresh examples, obtained by Mrs. Bent, exhibit a style of coloration similar to that of the lineated forms of *O. complanatum*.

The species was founded by Bourguignat, only upon Godwin-Austen's description and figures, and not upon an actual examination of specimens.

40. *Otopoma clathratulum*, Récluz.

Otopoma clathratulum, Récluz, Rev. Zool. Soc. Cuv., p. 3 (1843); Reeve, Conch. Icon., pl. xviii. fig. 116b; Crosse, Op. cit. p. 363; Godwin-Austen, Moll. India, vol. ii. p. 30.

Otopoma clathratulum, var. *minor*, Godwin-Austen, P.Z.S., 1881, p. 255.

"Shell orbiculate-conical, yellowish-orange; whorls 5, convex, flattish at the suture, transversely, regularly, and finely sulcated, very closely clathrated by fine longitudinal striae, with more or less brownish transverse bands; uppermost whorls with a black zone at the base; the last banded with pale orange at the middle, the band being bordered with brown, smooth beneath; aperture orange within, banded with reddish-brown, acute at the margin; umbilicus deep, pervious.

"Length, 22 mm.; diameter of last whorl, 23.5; height of spire, 11.3."
(Translation from *Petit*.)

Sokotra: Dimichiro Valley, East Sokotra.

The var. *minor* of Godwin-Austen differs only from the typical form in the absence of the spiral colour-lines, the form and sculpture being almost identical. The size quoted by the author (major diameter 18 millim.) is altogether misleading, as the largest of the specimens placed by him as this variety is 25 millim., the normal size of the species. All the examples have the dark purplish zone above the suture upon the upper part of the spire.

This variation in size is of no importance whatever in a varietal point of view, for all sizes of the typical form were collected by Dr. Forbes and Mr. Grant, ranging from 25 to 15 millim. in the greatest diameter, the smallest, judging from the thickened peristome, being as adult as the largest.

The var. *socotrana* (Godwin-Austen) appears to be very distinct from this, and has, in my opinion, been rightly raised to specific rank by M. Bourguignat.

[Under bushes in the damp sand of the dry river bed; on the foliage of the bushes also.—H.O.F.]

41. *Otopoma conicum*, Godwin-Austen.

Otopoma conicum, Godwin-Austen, P.Z.S., 1881, p. 255, pl. xxviii. fig. 1, 1b; Crosse, Op. cit. p. 364.

Rochebrunia conica, Bourguignat, Voy. pays Comalis, Moll., p. 84 (1882).

Col. Godwin-Austen has given the following description of the Type:—

"Shell conoid, closely umbilicated, solid; sculpture fine, regularly disposed spiral ribbing crossed by fine costulation, continued to well within the umbilical region; colour white; spire conic, sides rather flat, apex subacute; suture, rather shallow; whorls 5, the last well

rounded, slightly descending ; aperture circular, suboblique ; peristome very thin ; columellar margin simple, but reflected ; operculum shelly, solid, paucispiral, of 3 whorls, smooth subcentral nucleus depressed, concave behind.

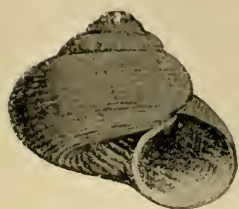


FIG. a.

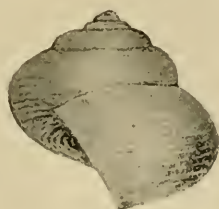
FIG. c.
(ENLARGED.)

FIG. b.

"Size : major diameter 11·0, minor diameter 10·0, alt. axis 7·0 mm."

The types of this species appear to be bleached shells, for a careful examination of them reveals faded colour markings upon the upper surface.

[This species was not obtained by us.—*H.O.F.*]

42. *Otopoma* (?) *radiolatum* (Martens).

Cyclostoma radiolatum, Martens ; Nachrbl. Deutsch. Malak. Ges., xiii. p. 135 (1881) ; Crosse, Op. cit. p. 366.

The following is a translation of the original description :—

"Shell subdepressed-turbinate, moderately umbilicated, sculptured with rather close spiral costæ, 7·8 in the penultimate whorl, pale cinnamon colour, with radiating straight or flexuous yellow-white lines above ; whorls $4\frac{1}{2}$, the first papilliform smooth, the last rounded, with the basal costæ more distant ; aperture circular, peristome thin, scarcely expanded, pale.

"Greater diameter, 13 mm. ; minor diameter, 10·5 ; height, 11 ; aperture, 6 wide."

The generic position of this species is at present uncertain, the operculum being unknown. It seems, however, rather closely related both to the preceding and following species.

[This species was collected by Drs. Riebeck and Schweinfurth near Hadibu, and on the Wadi Kischen (1900 ft.).]

43. *Otopoma turbinatum*, Godwin-Austen. (Plate xiii. figs. 7-9.)

Otopoma turbinatum, Godwin-Austen, P.Z.S., 1881, p. 255, pl. xxviii. fig. 2;
Crosse, Op. cit. p. 364.

Rochebrunia turbinata, Bourguignat, Voy. pays Comalis, Moll., p. 84 (1882).



(ENLARGED.)

The following is the description of the Type specimen:—

“Shell turbinate, umbilicated; sculpture regular, fine, equally distributed, spiral ribbing smooth on the last whorl near the umbilicus; apex smooth; colour white; spire pyramidal; suture impressed; whorls $4\frac{1}{2}$, well rounded; aperture nearly circular, slightly angular above; peristome thin, much curved on the columellar margin.

“Size: major diameter 8·8, minor diameter 7·9, alt. axis 5·0 mm.”
(Godwin-Austen.)

Sokotra: Adho Dimellus (3500-4000 ft.).

The type is a dead bleached shell, and consequently was described as “white.” Traces of colour are, however, observable, and it seems probable that its style of coloration was similar to that of *O. radiolatum*, *Cyclotopsis ornata*, and the following variety.

Var. Shell very similar to those from Adho Dimellus, but a little more coarsely costulate below, and smooth within the umbilicus (fig. 9).

Sokotra: Homhil (1500-2500 ft.).

The operculum is very similar to that of *Cyclotopsis ornata*, but the outer whorl is larger in proportion, and the spire is more rapidly coiled. It is, in fact, a link between that of a typical *Otopoma* and that of *Cyclotopsis*.

Fresh specimens are very prettily banded with brown, with a pale zone at the periphery, and rayed and dotted with white above, the lower surface usually being destitute of markings and translucent dirty whitish.

Cyclotopsis, *Blanford.***44. *Cyclotopsis ornata*, *Godwin-Austen.***

Cyclotopsis ornatus, Godwin-Austen, P.Z.S., 1881, p. 257, pl. xxviii. fig. 5, 5a; Crosse, Op. cit. p. 366.

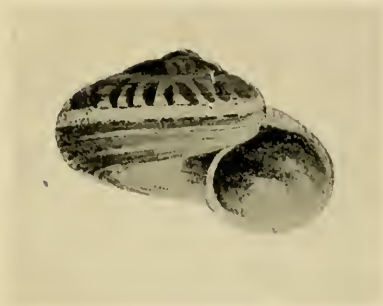


FIG. a.

(ENLARGED.)

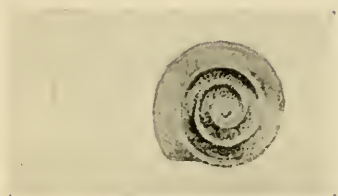


FIG. b.

The following is the description of the Type :—

“Shell openly umbilicated, depressedly conoid, thin; sculpture spiral, sulcation, every other rib being more strongly developed, crossed transversly by fine costulation; colour pale sienna with a pale ochre band on the periphery and with zig-zag markings of the same colour on the second whorl, this colouration only seen well on young shells; spire somewhat low, apex smooth; whorls 4, well rounded, the last very slightly descending; aperture circular, oblique; peristome thin, scarcely reflected on the inner margin; operculum shelly, concentric, of 4 whorls; the margin well reflected outwards, its edge forming a continuous raised smooth spiral rib.

“Size: major diameter 8·2, minor diameter 6·8, alt. axis 3·8 mm.”

[This species was obtained by Professor Balfour on the slopes of Aduna (at about 2000 ft.); but not by us.—H.O.F.]

Tropidophora, *Troschel.***45. *Tropidophora socotrana*, *Godwin-Austen.* (Plate xiii. figs. 5, 6.)**

Tropidophora socotrana, Godwin-Austen, P.Z.S., 1881, p. 255, pl. xxviii. figs. 3-3b; Crosse, Op. cit. p. 365.

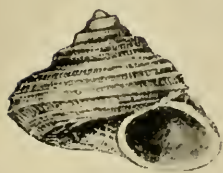


FIG. a.

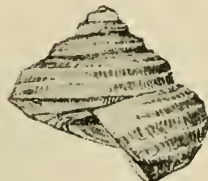
FIG. c.
(ENLARGED.)

FIG. b.

The following is Godwin-Austen's original description :—

"Shell trochiform, umbilicated, rather solid; sculpture three strong longitudinal ribs on the periphery with a fine intermediate one, and two above near the suture, crossed by strong lateral close ribbing or lines of growth; similar longitudinal sulcation on the base, smooth on the apex; colour white, ruddy within the aperture; spire pyramidal, sides flat; suture shallow; whorls $5\frac{1}{2}$, convex, the last slightly descending near the aperture; this is circular and oblique; peristome rather thin; operculum subtestaceous, paucispiral, rapidly increasing, nucleus subcentral.

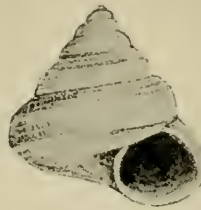
"Size: major diameter 10·0, minor diameter 9·2, alt. axis 6·4, total alt. 9·0 mm."

Sokotra: Homhil (1500-2500 ft.).

Very variable in size and form, the largest specimen (fig. 6) from the above locality, 14 millim. in diameter, being much more depressed than the type, acutely keeled at the periphery and much more openly umbilicated. Other specimens, however, in the collection form connecting links between this depressed form and the type. Some fresh examples collected by Mrs. Bent (fig. 5) are pale cinereous, rayed and spotted above with a darkish tint, the aperture being deep brown or orange within, but pale at the peristome.

46. *Tropidophora balfouri*, Godwin-Austen.

Tropidophora balfouri, Godwin-Austen, P.Z.S., 1881, p. 256, pl. xxviii. fig. 4; Crosse, Op. Cit. p. 365.



(ENLARGED.)

"Shell elongately pyramidal, umbilicated, keeled, solid; first two apical whorls smooth, rest of shell ribbed spirally and on the base; seven ribs on each whorl, crossed by well-developed transverse ribbing; colour marbled white, ruddy brown or orange within; spire pyramidal acuminate, sides flat; suture shallow; whorls 6, sides convex, the last descending very slightly near the peristome; aperture broadly ovate; peristome rather thin, continuous.

"Size: major diameter 7·5, minor diameter 7·0, alt. axis 6·3, total height 8·7 mm."

[Professor Balfour found this species on the top of the limestone ridge to the S.W. of Gollonsir; but we did not find it at the east end of the island --H.O.F.]

Lithidion, Gray**47. *Lithidion lithidion* (Sowerby).**

Cyclostoma lithidion, Sowerby, Thesaurus Conch., vol. i. p. 111, pl. xxxi. fig. 262.

Lithidion sulcatum, Gray, Cat. Cyclophoridae, Brit. Mus. p. 35.

Lithidion marmorosum, Godwin-Austen, P.Z.S., 1881, p. 256, pl. xxviii. fig. 6 6e; Crosse, Op. cit. p. 365.



Fig. a.

Fig. b. (ENLARGED.)

Fig. d.

Fig. c.

"Shell discoid, very solid, widely and openly umbilicated, sharply keeled; sculpture, strongly ribbed longitudinally, with 5 sulcations below and 4 above the peripheral sulcation, crossed by very fine lateral regular striation; colour marbly white; spire flatly depressed, apex papillate, polished; suture shallow; whorls 5, excentrically wound at the apex, the axis therefore not being perpendicular to the planes of the last whorl (Figs. b, d); aperture circular, oblique; peristome reflected, strongly developed on the columellar margin; operculum shelly, concentric, of 3 whorls; the margin reflected, forming a raised spiral rib." "Major diameter 10·7, minor diameter 9·2, alt. axis 3·2."—(Godwin-Austen.)

Sokotra: Dahamis (350-1000 ft.); also Jena-agahan (1200-2500 ft.).

This species, which was first described as from "Yemen, Arabia," is very variable in size, also in form, some specimens being much more depressed than others and more widely umbilicated. Those from Jena-agahan are remarkably flat and strongly carinate, only the apex of the spire being above the level of the body-whorl, and with the liræ within the umbilicus stronger than usual. The fine series of specimens, obtained by Mrs. Bent, Dr. Forbes, and Mr. Grant, clearly proves that *L. lithidion* and *L. marmorosum* are one and the same species; indeed the locality, "Yemen, Arabia," assigned to the former

has yet to be confirmed. To show the variation in size, the measurements of two extreme but equally adult examples are given :—

Major diameter 12 millim., minor 10.
 " " $8\frac{1}{2}$ " " 7.

Godwin-Austen notes that "the animal is pale ash-grey; tentacles black; foot divided longitudinally, proboscis long, bilobed."

48. *Lithidion bentii*, Smith.

Lithidion bentii, Smith. Journ. Malacol., vol. vi. p. 38, pl. v. fig. 9, 9B.

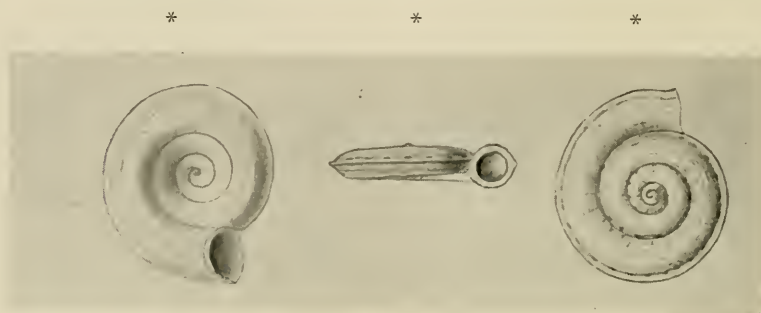


FIG. a.

FIG. b.
(ENLARGED.)

FIG. c.

Shell discoid, very openly umbilicate, sharply carinate, white or pale rufescent above, slightly shining; spire flat; whorls 5, the two apical whorls (protoconch) smooth, very convex, the rest with four slender spiral line above, slightly convex, here and there radiately subplicate, the last ornamented with a sharp compressed peripheral keel, reddish beneath, having four or five concentric liræ; aperture rounded inside; peristome white, the margins joined by a callus, the upper margin dilated above, the lower thickened, scarcely reflexed.

Size: major diameter 13.0 mm., minor diameter 11.0, height 3.0.

Very depressed, with an acute peripheral keel, a small aperture, and almost smooth within the umbilicus, which is shallower than that of *L. lithidion*, and the whorls within it are also less convex.

[The occurrence of the following species in Sokotra requires confirmation :—

Lithidion desciscens (Pfeiffer).

Cyclostoma desciscens, Pfr., P.Z.S., Lond., 1851, p. 243; Crosse, Op. cit. p. 366.

Cyclostoma desciscens, the type of which is in the British Museum, is identical in every respect with *Lithidion souleyetianum* from Abd-el-Kuri.]

MELANIIDÆ.

Melania, Lamarck.49. *Melania scabra* (Müller).

Buccinum scabrum, Müller, Verm., 529, p. 156 (1775).

Melania scabra, Godwin-Austen, P.Z.S., Lond., 1883, p. 5 pl. ii. figs. 1, 1a, 2, 3; et var. pl. ii. fig. 2; var. pl. ii. fig. 3.

Melania pagoda, Godwin-Austen, Op. cit. p. 7 pl. ii. fig. 10; et var. pl. ii. fig. 9.

Melania scabra, Crosse, Op. cit. p. 359.

Most of the specimens from Sokotra belong to the form *elegans*, Benson, which apparently is specifically inseparable from the present species. A few shorter examples, however, with longer and more pronounced spines, have been met with. These are figured by Godwin-Austen as *M. pagoda* of Lea. It seems impossible to draw any line of separation between this species, *M. pagoda*, *M. denticulata*, Lea, *M. datura*, Dohrn, and some other forms.

50. *Melania tuberculata* (Müller).

Nerita tuberculata, Müller, Verm., 378, p. 191 (1775).

(?) *Melania formosensis*, Smith, P.Z.S., 1878, p. 728 pl. xlv. fig. 4.

Melania tuberculata, Godwin-Austen, P.Z.S., 1883, p. 5 pl. ii. figs. 5 and 6; and smooth var. fig. 4.

Melania sclateri, Godwin-Austen, Op. cit. p. 7 pl. ii. fig. 8.

Melania tuberculata, Crosse, Op. cit. p. 359.

Melania tuberculata, var. *sublaris*, Crosse, Op. cit. p. 359.

Typical specimens of this species occur in Sokotra, besides several varieties. A smooth form (var. β . *sublaris*, Crosse, Op. cit. p. 359), figured by Godwin-Austen (P.Z.S., 1883, p. 5, pl. ii. fig. 4), has only faint traces of longitudinal costulations, and the spiral sulci are also rather feeble. The "milky white" aperture is merely occasioned by a chalky deposit, which disappears on being wetted, revealing the usual colour markings. Other examples, collected by Mrs. Bent and Dr. Forbes and Mr. Grant at Jena-agahan, are scarcely separable from *M. formosensis*, Smith, (P.Z.S., 1878, p. 728, pl. xlv. fig. 4), also probably merely a smooth variety of this polymorphous and widely distributed species, which also occurs in Formosa in its normal form.

M. sclateri, Godwin-Austen, founded on fragments and very young shells, is a banded form, of which two specimens, 17 and 25 millim. in length respectively, were collected by Mrs. Bent. The larger one, however, has red spots in place of the infrasutural band. Although not mentioned by Godwin-Austen, distinct traces of longitudinal plications occur on the spire of the type, which are well developed in Mrs. Bent's specimens.

An example from Hadibu Plain, obtained by Dr. Forbes and Mr. Grant, has the two last whorls black, excepting a pale zone beneath the suture, and the white columella. The upper part of the spire, however, is paler, and streaked with red upon the granose costulations.

Sokotra: Hadibu Plain; Jena-aghan.

This species has been recorded from Madagascar, Mauritius, India, Ceylon, Syria, Persia, Arabia, Java, Siam.

AURICULIDÆ.

Auricula, Lamarck.

51. *Auricula socotrensis*, Smith.

Auricula socotrensis, Smith, Journ. Malacol., vol. vi. p. 37, pl. v. figs. 8, 8a.



(ENLARGED.)

Shell elongate-ovate, imperforate, olive-brown, smooth, striated with fine lines of growth; spire short, convexly conoid, mammillated at the apex; whorls 7, the first convex, the rest scarcely convex, sometimes more or less spirally punctate, the last elongate, with the sides slightly convex; aperture inversely elongately ear-shaped; labrum thin, very slightly thickened within; columella with fourfolds, the two upper subjoined, the lower ones stronger.

Length 9, diameter 4 mm., aperture 7 long.

Allied to *A. pusilla*, H. & A. Adams, *A. nerillii* and *gassiesi* of Morelet, and a few other species, but quite distinct.

Sokotra.

[This species, the Type of which was collected by Mrs. Bent, was not found by us.—H.O.F.]

LIMNÆIDÆ.

Planorbis, Guettard.

52. *Planorbis exustus*, Deshayes.

Planorbis exustus, Deshayes, Voy. Belanger, p. 417, pl. i. figs. 11, 13 (1854).

Planorbis exustus, var. *maculatus*, Godwin-Austen, P.Z.S., 1883, p. 3, pl. i. figs. 1, 1a, 1b.

Planorbis exustus, Crosse, Op. cit, p. 358.

Sokotra: Hadibu Plain.

[Under and on bushes.—H.O.F.]

Riebeck, Schweinfurth, and Balfour all found this species.

An Indian species.

53. *Planorbis socotrensis*, Godwin-Austen.

Planorbis socotrensis, Godwin-Austen, P.Z.S., 1883, p. 3 pl. i. figs. 3, 3a, 3b, 3c; Crosse, Op. cit. p. 358.

The following is the description of the Type :—

“Shell minute, discoid, apical and basal sides equally concave; sculpture, obliquely striate with lines of growth, otherwise smooth with very minute pitting or malleation; colour pale ochraceous; suture well impressed; whorls 3, flat on the periphery, angular above and below, side subvertical; aperture rhomboidal, rather wider than high; peristome thin, continues as a thin callus on the body whorl, arched above, straight below.

“Size: major diameter, 3·4; alt. axis, 0·5 mm.”—(*Godwin-Austen*).

Sokotra.—(*Balfour*.)

54. *Planorbis cockburni*, Godwin-Austen.

Planorbis cockburni, Godwin-Austen, P.Z.S., 1883, p. 4, pl. i. figs. 2, 2a, 2b; Crosse, Op. cit. p. 358.

The Type was described by Godwin-Austen as follows :—

“Shell discoid, diaphanous; sculpture, fine oblique striation, almost costulation, on the first whorls; colour pale horny-brown; suture impressed; whorls $2\frac{1}{2}$; aperture broadly ovate.

“Size: major diameter, 4·3; alt. axis, 1·1 mm.”

Sokotra.—(*Balfour*.)

PALUDESTRINIDÆ.***Paludestrina*, d'Orbigny.****55. *Paludestrina balfouri* (Godwin-Austen).**

Hydrobia ? balfouri, Godwin-Austen, P.Z.S., 1883, p. 4 pl. i. figs. 4, 5; Crosse, Op. cit. p. 359.

Col. Godwin-Austen describes the Type as follows :—

“Shell elongately oval; sculpture, quite smooth, a few eroded patches on the apical whorls; colour white, another (smaller) specimen ash-brown; spire high, somewhat attenuate; whorls 5, penultimate the largest, its sides convex; aperture subvertical, broadly ovate or nearly circular; peristome thin, well-rounded below; operculum not seen.

“Size: major diameter, 1·3; alt. apert., 0·9; alt. axis, 2·1 mm.”

II.—Land Shells of Abd-el-Kuri.

The known Land Shells of this island, with the exception of *Tropidophora modesta*, are all very small forms in comparison with those from Sokotra, and do not range outside the island. Nine species, belonging to the genera *Buliminus*, *Tropidophora* and *Lithidion*, are now known. As all were obtained by Dr. Forbes and Mr. Grant during their two short visits of three or four days only, it seems probable that much still remains to be done in the investigation of the fauna, and doubtless other forms will eventually be discovered by future collectors. No fresh-water forms have yet been noticed, and possibly they do not occur, there being no water on the island except during the wet season.

PUPIDÆ.

Buliminus, Beck.

1. *Buliminus* (*Chondrula*) **granti**, Smith. (Plate xiii. fig. 2.)

Buliminus (*Chondrula*) *granti*, Smith, Bull. Liver. Muss., ii. p. 12.

Shell ovate, acuminate above, rimate, subpellucid, pale brownish horn-colour, smooth; whorls $5\frac{1}{2}$, somewhat convex, sculptured with oblique very fine lines of growth, margined below the suture with a pellucid line, the last slightly obliquely descending behind, but slightly ascending at the labrum; aperture inversely auriform, with two teeth; peristome thickened, white, the margins almost joined by a slender callus, the right scarcely reflexed, with a prominent tubercle within in the middle, columellar unidentate above, expanded and reflexed.

Length 11, diameter $5\frac{1}{2}$ mm.; aperture 4 long, 3 broad.

Abd-el-Kuri.

The parietal callus does not quite join the upper end of the labrum, so that a narrow sinus or slit is formed at this place.

2. *Buliminus* (*Mastus*) **contiguus**, (Reeve).

Bulimus contiguus, Reeve, Conch. Icon. v. *Bulimus*, fig. 582 (1849); Crosse, Op. cit. p. 367.

Bulimus teres, Pfr., Zeitschr. Malak., 1849, p. 90.

"Shell elongately cylindrical, not umbilicated, whorls nine in number, flatly convex, smooth, polished, faintly impressly crenulated at the sutures, columella broad, vertical; aperture minute, margins thickened, reflected, joined above by a callosity; ivory white."—(Reeve.)

Length 12, diameter 3 mm.

Abd-el-Kuri (800-1500 ft.).

[Under stones on side of the high peak Gebel Saleh, overlooking our anchorage at Bandar Saleh.--H.O.F.]

3. **Buliminus** (*Achatinelloides*) **guillaini**, *Petit*. (Plate xii. figs. 15-17.)

Buliminus (Orella) guillaini, Petit, Journ. Conchyl., i. p. 77 pl. iv. figs. 4, 5 (1850); Crosse, Op. cit. p. 368.

"Shell oblong, cylindrical, thickish, imperforate, brownish, variegated with white, sometimes subbanded, whorls 8-9, flatly convex, obliquely and closely striated; columella very much curved, subplicate below; aperture ovate; labrum acute, subreflexed; labium consolidated in adult specimens."—(*Petit*.)

Length 6 mm.

Abd-el-Kuri (1600-1750 ft.).

Very variable in colour. Most of the specimens are brown, mottled with creamy white, and often banded at the periphery with brown or white. Some examples are rich brown, with a white zone at the suture and round the middle of the body-whorl. Others are pellucid white, with opaque white mottling.

[On the upper regions of Gebel Saleh (1750 ft.), overlooking our anchorage in Bandar Saleh, filling the crevices of the limestone rocks in immense numbers—*H.O.F.*; and in numbers under loose stones below the crest of the hill.—*W.R.O.G.*]

4. **Buliminus** (*Achatinelloides*) **fuscoapicatus**, *Smith*. (Plate xiii. fig. 20.)

Buliminus (Orella) fuscoapicata, Smith, Bull. Liverpool Muss., ii. p. 13.

Shell ovate, acuminate above, scarcely rimate, pale grey, brown at the apex, obliquely very finely costulated; spire conical; whorls 6, two uppermost brown, globose, smooth, the rest somewhat convex, the last subglobose; aperture broadly ear-shaped, brown within; labrum thickened, not expanded or reflexed externally, whitish, the columellar margin being dilated and reflexed.

Length $8\frac{1}{2}$, diameter 6 mm.; aperture 4 long, 3 broad.

Abd-el-Kuri (800-1500 ft.).

A few darkish dots are generally scattered over the grey surface.

5. **Buliminus** (*Achatinelloides*) **pauxillus**, *Smith*. (Plate xiii. fig. 18.)

Buliminus (Orella) pauxillus, Smith, Bull. Liverp. Muss., ii. p. 12.

Shell small, ovate-conical, rimate, grey, striped with brown, generally with a white band at the periphery, brownish at the obtuse apex; spire conoid; whorls 5, two uppermost convex, smooth, brown, the rest convexish, obliquely finely costulated; aperture brown; peristome pale, slightly thickened, the margins almost joined by a slender callus, the external not expanded, the columellar dilated and reflexed.

Length 6, diameter 4 mm.; aperture 3 long, $2\frac{1}{2}$ broad.

Abd-el-Kuri (800-1500 ft.).

Smaller than *B. fuscoapicata*, more strongly costulate and differently coloured. The body-whorl often has a somewhat shouldered appearance.

POMATIIDÆ.**Tropidophora, Troschel.****6. Tropidophora modesta (Petit).**

Cyclostoma modestum, Petit, Journ. Conchyl., i. p. 50 pl. iv. fig. 2 (1850);
Crosse, Op. cit. p. 368.

“Shell orbiculate depressed, widely umbilicated, very pale brown, spirally strongly sulcated subtricarinate, transversely, finely, and closely striated; whorls 5, depressed-convex, divided by a deep suture; aperture suborbicular, oblique; labrum reflexed, anteriorly subquadrangular, the median angles the largest.

“Diameter 26, height 12 mm.”—(*Petit*).

Abd-el-Kuri (800-1500 ft.).

Dead shells only and without opercula.

[Found abundantly under stones and roots of grass on the upper slopes of the mountain over against our anchorage.—*H.O.F.*]

Lithidion, Gray.**7. Lithidion souleyetianum (Petit). (Plate xii. fig. 2.)**

Cyclostoma souleyetianum, Petit, Journ. Conchyl., i. p. 52 pl. iii. fig. 6 (1850).

Lithidion souleyetianum, Crosse, Op. cit. p. 369.

Cyclostoma disciscens, Pfr., P.Z.S., Lond., 1851, p. 293; Conch. Cab. (Ed. 2), p. 262, pl. xxxv. figs. 25, 26.

“Shell orbicular, conic-depressed, deeply umbilicated, fleshy-brownish, or tinted with rose; whorls 5, spirally sulcate, transversely subcanellated, the last smooth beneath, shining; aperture oblique, semilunate, yellowish; labrum white, scarcely reflexed; labium callous.

“Diameter 8-10, height 3-5 mm.”—(*Translation from Petit*).

Abd-el-Kuri (800-1500 ft.).

A few specimens exhibit two narrow spiral brown bands upon the last whorl, one above and one below the periphery. Others are uniformly white.

8. Lithidion forbesianum, Smith. (Plate xii. fig. 3.)

Lithidion forbesianum, Smith, Bull. Liver. Mus., ii. p. 12.

Shell depressed, orbicular, widely umbilicated, spirally costulated, subclathrate with conspicuous oblique lines of growth, above pale or dark brown, paler below; spire short; whorls 5, convex, separated by a deepish suture, two uppermost smooth, the last descending in front, with the lire less conspicuous below than above, smoother; aperture almost circular, brown within; peristome white, with the margins joined by a thin callus, almost continuous, the outer slightly expanded, the columellar thickened, less reflexed.

Greater diameter 8, lesser diameter $6\frac{1}{2}$ mm., height 5.

Abd-el-Kuri (800-1500 ft.).

Quite distinct, although very closely allied to *L. souleyetianum*, but differing chiefly in the form of the aperture and the operculum, which is more concave externally. It is extremely variable in size, ranging from 10 to 7 millim. in diameter.

9. *Lithidion gratum*, (Petit). (Plate xii. fig. 1.)

Cyclostoma gratum, Petit, Journ. Conchyl., i. p. 53 pl. iii. fig. 10 (1850).

Guillainia grata, Crosse, Op. cit. p. 370.

"Shell conic, pale rose; whorls 5-6, rounded, spirally finely sulcate, transversely very finely cancellated; suture distinct; apex brownish; aperture rounded, bright red within; labrum single; umbilicus bordered by an angle.

"Diameter 5, height 6 mm."—(Translation from Petit).

Abd-el-Kuri (1750 ft.).

The operculum of this species, which was unknown to M. Crosse when he described the genus *Guillainia*, is almost precisely similar to that of *L. souleyetianum*. The elevation of the spire and the keel around the umbilicus are specific rather than generic characters, and the form of the aperture and peristome is almost identical with that of *L. forbesianum*. There seems, therefore, no reason for the employment of the so-called genus *Guillainia* for this species. Some specimens have a bright red zone below the middle of the body-whorl. Considerable variation occurs, both as regards the height of the spire and the coarseness or fineness of the spiral sculpture.

Two dead specimens, apparently belonging to this species, are remarkable for their size, the larger being 11 millim. long and 6½ broad. This specimen has a very narrow umbilicus, the faint keel or angle which usually surrounds it is wanting. There is a faint trace of it in the second smaller example.

[Many living specimens were found among the crevices of the rocks on the summit of Gebel Saleh, the highest point on the island.]

[The occurrence of the following species in Abd-el-Kuri requires confirmation:—

***Otopoma naticoides*, Récluz.**

Cyclostoma naticoides, Récluz., Rev. Zool. Soc. Cuv., p. 3 (1843); Crosse, Op. cit. p. 369.

This species is probably restricted to Sokotra.]

PLATE XII.

- Fig. 1. LITHIDION GRATUM, p. 155.
- Fig. 2. ,, SOULEYETIANUM, p. 154.
- Fig. 3. ,, FORBESIANUM, p. 154.
- Figs. 4, 5. OTOPOMA COMPLANATUM, p. 140.
- Fig. 6. ,, SOCOTRANUM, p. 141.
- Fig. 7. BULIMINUS (ACHATINELLOIDES) ACUTUS,
p. 126.
- Fig. 8. ,, (,,) LÆVIOR, p. 119.
- Fig. 9. ,, (,,) MISTUS, p. 120.
- Figs. 10, 14. ... ,, (,,) DAHAMISENSIS,
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- Fig. 11. ,, (,,) BALFOURI, var.
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- Fig. 13. ,, (ACHATINELLOIDES) HOMHIL-
ENSIS, p. 118.
- Figs. 15, 16, 17. ,, (,,) GUILLAINI, p. 153.

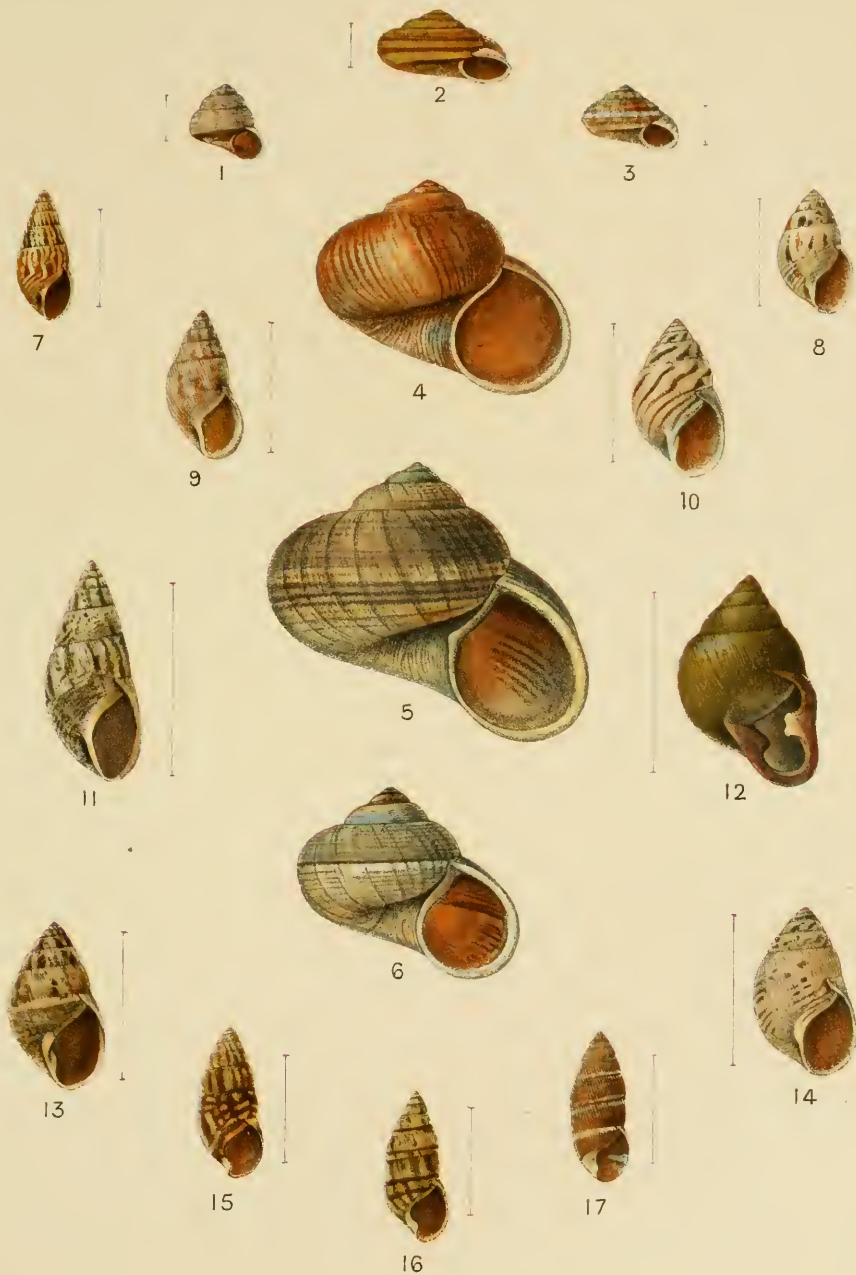
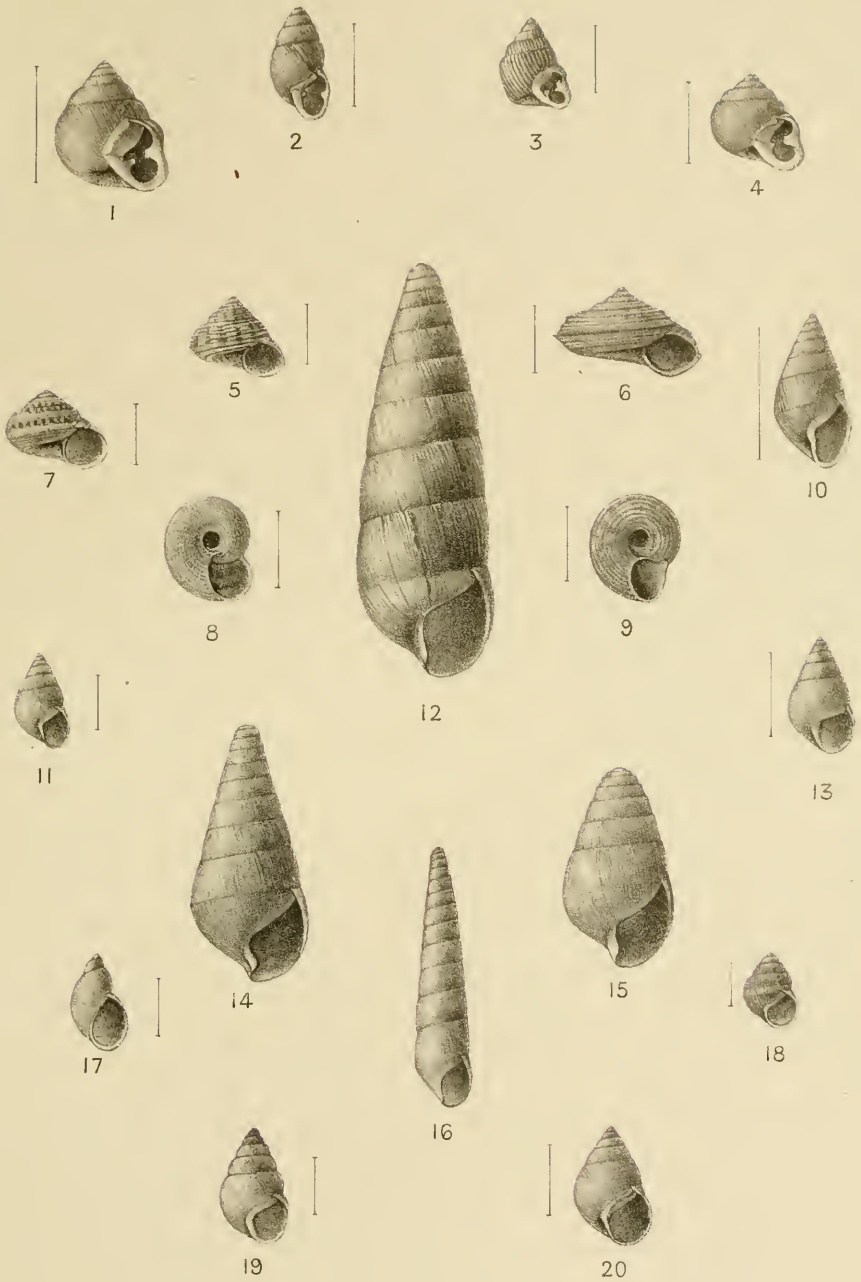


PLATE XIII.

- Figs. 1, 4..... BULIMINUS (PASSAMAIELLA) ROTUNDUS,
p. 116.
- Fig. 2..... „ (CHONDRULA) GRANTI, p. 152.
- Fig. 3..... „ (PASSAMAIELLA) PASSAMAIANUS,
var. EURYOMPHALA, p. 113.
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- Fig. 10..... BULIMINUS (ACHATINELLOIDES) DENSICOSTULATUS, p. 121.
- Fig. 11..... „ („) ADONENSIS, p. 128.
- Fig. 12..... STENOGYRA GOLLONSIRENSIS, p. 132.
- Fig. 13..... BULIMINUS (PACHNODUS) FRAGILIS, p. 129.
- Fig. 14..... STENOGYRA (RIEBECKIA) DECIPIENS (top of
spire), p. 132.
- Fig. 15..... „ („) SOKOTORANA (top of
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- Fig. 16..... „ („) ENODIS, p. 135.
- Fig. 17..... SUCCINEA SOKOTRENSIS, p. 112.
- Fig. 18..... BULIMINUS (ACHATINELLOIDES) PAUXILLUS,
p. 153.
- Fig. 19..... „ ARTUFELIANUS, p. 131.
- Fig. 20..... „ (ACHATINELLOIDES) FUSCOAPICATUS, p. 153.



Morphological Observations

On Genera of the Families.

Cyclostomidæ and Helicidæ.

By Lieut.-Colonel

H. H. GODWIN-AUSTEN, F.R.S.

PLATE XIII A.

Morphological observations on species belonging to the Families Cyclostomidæ and Helicidæ.

The late expedition to the islands of Sokotra and Abd-el-Kuri, so successfully carried out by Dr. H. O. Forbes and Mr. Ogilvie-Grant, has brought back even among the Mollusca some valuable material. After the fine series collected by Professor Bayley Balfour in 1880, and the interesting shells obtained by Mr. and Mrs. Theodore Bent during the short time they spent on the island in 1897, it was not to be expected many new species would be found, and such is the case among the operculated land shells. We are enriched, however, by examples of species preserved in spirit, and, among them, genera of much interest, *Otopoma*, *Bulininus*, and *Lithidion*, the animal of the latter not having been examined as to its internal anatomy. Another genus is *Guillainia*, of the animal of which nothing was known. These forms I now describe, with a few remarks on the distribution of some of these Sokotran *Cyclostomidæ*; and I have to thank Mr. Edgar Smith for supplying me with some of the specimens which the above-named naturalists had placed in his hands. I shall not refer in any way to the shells, Mr. Smith having, on pages 109-155, given a complete account of the whole collection.

Otopoma, Gray.

Animal with a short, oval, divided foot. Mantle margin free in front.

The muzzle divided into two lobes.

Eyes prominent on the outer side of the tentacula near the base.

The male organ is exophalliate, situated close to and just above the rectum at the right posterior side of the branchial chamber.

The teeth of the *radula* are narrow and elongate, with minute serration arranged 3-1-3. No buccal plates.

Two species have been examined *O. naticoides*, Récluz, and *O. clathratula*, Récluz, var. *minor*, G.-A.

Otopoma naticoides, Récluz.

I have described this species in *The Land and Fresh-Water Mollusca of India*, p. 30, pl. lxvii. figs. 1-6 as follows:—

“The animal is very pale ochre-coloured, with a short, broadly oval, divided foot; the muzzle is transversely striated. The penis is large, broadly thickened, and tongue-like, diminishing rapidly at the free end into a sharp point; the seminal duct appears to run down the side of the muscular sheath, and the seminal orifice is situated on

the flat underside, a very short distance from the pointed end. The rectum is situated immediately to the right, and runs as a tube attached to the side of the branchial chamber for some distance, and then has a short free end at the anal orifice. In the female the rectum is not so long, and the female orifice is just above it.

"The centre tooth of the radula (fig. d. p. 165) is straight-sided, gradually narrowing from the base, elongate, bearing five minute cusps on a slightly curved edge. The first side-tooth is very long, gradually widening from the base, and curving over and inwards at the cutting-edge, with about six or more small teeth. The second and third are almost similar in form, narrowly elongate, sides parallel, with eight or ten minute serrations like the blunted teeth of a saw. On the underside of the buccal mass a congeries of fine convoluted tubes was seen, representing the salivary glands."

Otopoma clathratula, Récluz.

A spirit-specimen of *Otopoma clathratula*, var. *minor*, G.-A., the shell of which was described by me in the P.Z.S., 1881, p. 255, was also examined. The male organ is in the same position, but has a more elongated form and of the same diameter throughout. The radula is precisely like that of *O. naticoides*.

Lithidion, Gray.

This genus is represented both in Sokotra and on the neighbouring island of Abd-el-Kuri.

Lithidion lithidion, Sowerby. (Plate xiii A figs. 3, 3a.)

L. marmorosum, G.-A., was discovered on Sokotra by Professor Bayley Balfour, and its shell described in the P.Z.S., 1881, p. 256, pl. xxviii. figs. 6, 6c (see above, p. 147). Of this, one fine specimen reached this country alive, and lived through the summer. It was very sluggish, and did not shew itself often. It was eventually put into alcohol, and, being a typical specimen, I did not then like to break the shell to extract the animal, for very few specimens occurred in the collection. I have now done so, as we have examples of the genus in another species from Abd-el-Kuri, and a comparison of the two cannot fail to be of interest, and, combined, will give a better knowledge of its characters.

Original description of the animal from life:—

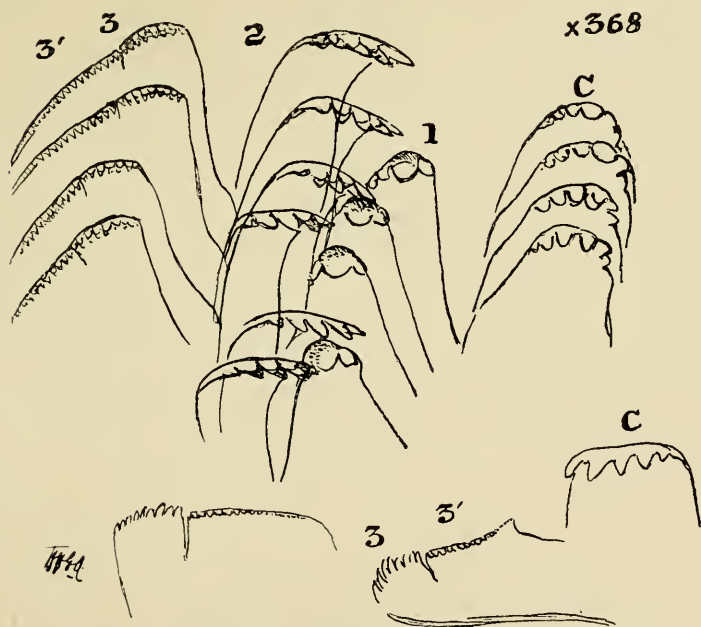
"Animal pale ash-grey; tentacles black; foot divided longitudinally; proboscis long, bilobed"; and Balfour records it as "very common everywhere on the ground." Forbes and Grant obtained a fine series of this species. The specimen now examined shows the division of the foot well (pl. xiii A. fig. 3). The *tentacula* are broad at the base, and of dark colour together with the top of the head. This specimen is a male, and shows that the genus is exopalliate. The penis is very long and pointed, and its base is situated close to the

anal aperture. In the drawing the bronchial wall has been slit and turned back. The operculum (pl. xiii A. fig. 3a) is spiral, of 3 whorls, regularly increasing, bounded by a thin raised rib: it is shelly, with a thin transparent border on the basal side. The *radula* is a beautiful structure (fig. a) with a formula.

$3'.3$	2	1	c	1	2	3.3^1
15-8	5	5	7	5	5	8-15

The central tooth (c) rather broad, and rounded at the cutting edge, long, and gradually widening at the base; the 1st tooth is narrower, and widens more rapidly; the 2nd has nearly parallel sides with a curved edge and well-developed cusps; the 3rd is distinctly divided into two separate parts, denoted by a longer or shorter cleft, and the greater size of the eight small cusps upon the inner side of the large broad plate. Those who have attentively examined such radulae as these under a high power know how the curvature of the cutting edges alters their outline, as they are viewed from different points. I give a sketch of the centre and outer teeth to show their curvature.

FIG. a.



RADULA OF LITHIDION LITHIDION.

Lithidion souleyetianum, *Petit*. (Plate xiii A. figs. 2-2e.)

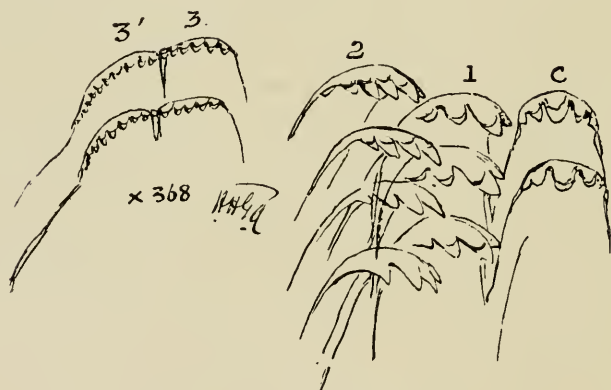
This species inhabits the island of Abd-el-Kuri, and was collected there by Messrs. Forbes and Grant. The shell differs in form from the species previously described. The whole animal is very pale in colour. On removing the shell, the shell muscle is conspicuous, rolled at the end by the action of the spirit in which it was preserved, pointing to a

lengthened spiral form (pl. xiii A. fig. 2a). The tentacula are short, eye at base on a slight swelling on the lower posterior side. The pulmonary veins are well seen, from being margined with black and cross the wall of the respiratory cavity transversely to join the main sinus on the right hand margin of the visceral sac (pl. xiii A. figs. 2 and 2b). The operculum is shelly, with a plane surface in front, spiral in structure, with about three broad whorls (pl. xiii A. fig. 2c). The *radula*-formula is this :—

$3^{1.3}$	2	1	c	1	2	3.3^1
8-1-5	5	4	5	4	5	5-1-8

The centre tooth has a long broad plate, wider below than at the toothed edge. The 1st and 2nd teeth are very similar in form, the inner having a wider basal plate. They both have nearly parallel sides, and are very long. The third tooth on the outside appears a compound of two originally distinct teeth merged into one broad plate. The cusps on the inner portion are larger than those on the outer, and there is a single distinct cusp between the two sides, *vide* figs. b and c, 3, 3^1 . I have not been fortunate in getting a male specimen, but it is no doubt similar to *L. lithidion* (= *L. marmorosum*) in being exophalliate, nor have I been able with the 3 specimens I have examined to give satisfactory drawings of the *genitalia*. They are not likely, however, to present any remarkable variation from the usual type.

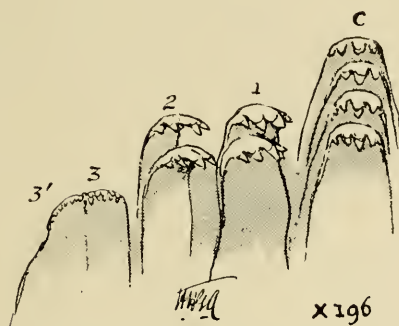
FIG. b.

RADULA OF *L. SOULEYETIANUM*.

Comparing these together, the most striking variation is found in the operculum. That of *L. lithidion* (pl. xiii A. fig. 3a) is exactly like that of *Cyclotopsis ornata*, G.-A., of Sokotra, fig. 5a on pl. xxviii., P.Z.S., 1881 (see p. 145 above), while the smooth operculum of *L. souleyetianum* (pl. xiii A. fig. 2c) is nearer to that of *Tropidophora socotrana*, G.-A., 3b of above plate (p. 145), but is not so distinctly paucispiral. This last species was placed by me in the above genus on shell-characters alone.

It is quite apparent these *radulae* are of the same type, with only that extent of variation we might expect to find in two distinct species from islands long separated by a deep sea. It is of great interest to find this type of *radula* in these Sokotran molluscs, for it leaves no doubt as to their true relationship, not by shell alone, to the genus

FIG. c.

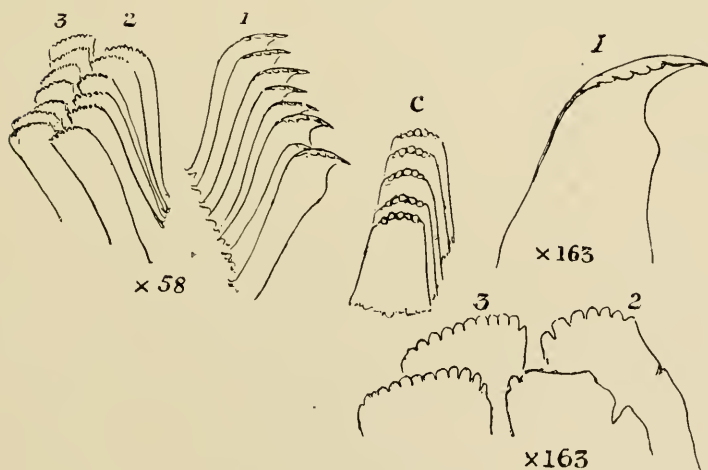
RADULA OF *L. SOULEYETIANUM* ON A MORE REDUCED SCALE.

Tropidophora, the headquarters of which is Madagascar. Neither of these species bear comparison with *Otopoma*. The *radula* of *O. naticoides*, the Sokotran species which I described and figured in Part VII., *Laud and Fresh-Water Mollusca of India*, p. 30, pl. lxvii. fig. 4, is reproduced below (fig. d), and both *O. naticoides* and *O. clathratula* have a similar odontophore with this formula,

3	2	1	c	1	2	3
8	10	6	5	6	10	8

the two outer teeth being of similar form.

FIG. d.

RADULA OF *O. NATICOIDES*.

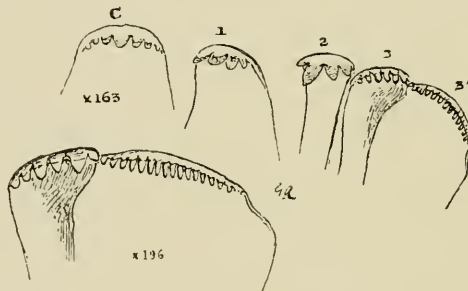
At the time I was working at *Otopoma* I was led to look for operculated land shells from South Africa, &c., preserved in spirit in the Natural History Collection of the British Museum. The only one to be found was a single specimen of *Tropidophora betsileensis*, E. Smith, which he kindly allowed me to examine. It was described and figured (*op. cit.* p. 32), and I cannot do better than copy what I then wrote:—

“It is a female specimen, and was very difficult to extract without breaking the shell, which I refrained from doing, as the animal was too hard to do much with. The *radula* proved most interesting, and it differs altogether from that of *Otopoma*, even in the formula, which is

$$(3^1.3) \quad 2 \quad 1 \quad c \quad 1 \quad 2 \quad (3.3^1)$$

Before receiving this, Mr. W. Moss very kindly forwarded me some well-mounted examples of *radula*, among them one labelled *Otopoma unifasciata*, Mauritius. Nevill, in his ‘Amended Hand-List,’ records two specimens of this species in the Indian Museum, received from the collection of Dr. Dohrn, but stated to be from Madagascar. Whether the species is found in both these islands is therefore doubtful. The *radula* of this species (fig. e, p. 166) differs remarkably from that of true *Otopoma*, and is altogether a beautiful

FIG. e.

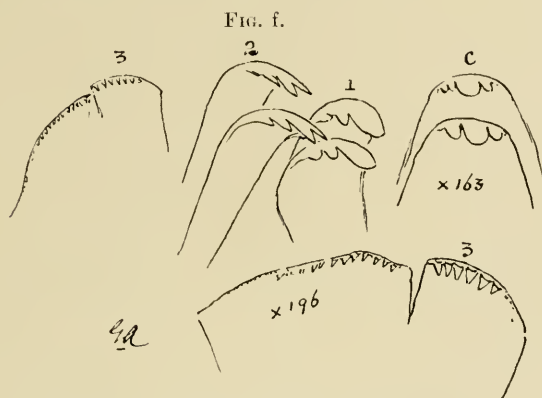
RADULA OF *TROPIDOPHORA?* *UNIFASCIATA*.

object. It indicates so considerable a divergence from *Otopoma* that when the animal comes to be examined and described, it may give it a very distinctive position among the *Cyclostomidae*. The centre tooth is broad, sides sloping inwards from the base, with a large centre cusp, and three smaller on each side of it; the first side-tooth has similar sloping sides, rounded above, with four cusps; the second side-tooth has parallel sides, and is five-cuspid; instead of the usual third side-tooth there are, to all appearance, four, the outermost being broad, like a rake in form, with very fine narrow sharp-pointed teethlets, set close together, about 14 in number; the next or true third side-tooth is narrower, with five cusps, much larger and more rounded in form, contrasting strongly with those on the outermost tooth; it is also apparent that this outer tooth can fold

almost upon itself, the inside margins being attached. The formula is therefore :—

$\frac{3^1.3}{6-14}$	$\frac{2}{5}$	$\frac{1}{4}$	$\frac{c}{7}$	$\frac{1}{4}$	$\frac{2}{5}$	$\frac{3.3^1}{6-14}$
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The *radula* of the *Tropidophora* (fig. f) in the British Museum, undoubtedly from Madagascar, was equally interesting, as it is of the Type just described, not that of *Otopoma*.



RADULA OF *TROPIDOPHORA BETSILEOENSIS*.

The centre tooth is rounded above, with straight sides sloping outwards to the broad base, tricuspid, but on some the large side cusp is replaced by two smaller ones; the second tooth has nearly parallel sides, sharply bent over on the cuspid edge, with four sharp narrow cusps; the third is made up of two very distinct portions, the inner one having 6-8 sharp-pointed teeth on a curved edge; then intervenes a long slit, and the next and outermost part is a curved edge, set with about twelve very fine saw-like cusps. In every respect it is like *unifasciata*, except that the outermost tooth is not so decidedly divided into two, the formula being :—

$\frac{3^1.3}{12-8}$	$\frac{2}{4}$	$\frac{1}{3}$	$\frac{c}{3}$	$\frac{1}{3}$	$\frac{2}{4}$	$\frac{3.3^1}{8-12}$
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Dr. F. H. Troschel, in his excellent work *Das Gebiss der Schnecken*, which contains such a mass of valuable detail, figures on fig. 11 a row of teeth of *C. ligatus*, from the Cape of Good Hope. In this species, which is said to be Mauritian, it is interesting to find the outermost tooth corresponding with those I describe in the Madagascar shell. In *C. ligatus* the cuspid edge of the last tooth is divided into nearly three equal curved sections, that on the inner having larger teethlets than the middle section. In fig. 12 Dr. Troschel gives a *radula* of *Leonia nemmilleris*, an African (Oran.) genus and species. In this species the outermost tooth shows also three distinct and differently

any other species from this part of the world which I have examined. C" is a drawing as viewed from the side. The first tooth is the largest, with five large cusps, turned 'over sharply'; the second is much smaller, narrow, with seven minute cusps; the third is very broad, slightly curved on the cutting margin. This tooth has an inner narrow portion (3x) shewn in profile, slightly separated from a wider one bearing minute cusps—4 and 10 respectively. It can be seen at once that this *radula* assimilates more to that of *Lithidion* than it does to *Otopoma naticoides*, which I have referred to above, its 3rd tooth being a composite one. Monsieur J. R. Bourguignat in *Mollusques terrestres et fluviatiles dans le pays des Comalis Medjourtin* (1881), placed this species under the name of *tricolor*, Pfr., p. 83, in his subgenus *Rochebrunia* of *Otopoma* on shell-characters, the Type being *R. obtusa*, Pfr., from Zanzibar and the Somali country. The shell of *obtusa*, figured by Bourguignat on pl. iv. fig. 60 to 64, presents the same high kind of spire as in *grata*, but the operculum of *obtusa* is not quite the same. Under whatever generic title the species *grata* may be known, it must be considered a sub-genus of *Tropidophara*, not of *Otopoma*.

Without going beyond the species of the *Cyclotomidae* inhabiting Sokotra and its outlying islands, there is much in the matter of distribution to attract attention. Their extension north, east, and west, is circumscribed, and, when found at all, they are sparsely represented. They are thus, as it were, isolated here, represented by a greater number of forms, the relationship of the majority being in the direction of a very characteristic fauna in the south.

Commencing with *Otopoma*, excluding mere varieties and including *Georgia*, a subgenus of Bourguignat, in Peninsular India we have only one species, *O. hinduorum*, W. T. Blf. The animal has never been examined, and when it is, it will be interesting to see how far it will agree with those of Sokotra. On the East African and Somali coast *Otopoma* is represented by two species: we do not know whether it is a coastal form or how far it may inhabit the country towards the west. From Arabia two species are recorded. In Sokotra we have the greatest number, viz., eight, and the finest forms.

Guillainia has not yet occurred in either India or Arabia or the African coast near Guardafui, which has been explored. *Rochebrunia*, in which *grata* is included by Monsieur Bourguignat, would appear to be a subgenus of *Otopoma*, the Type being *obtusa*, Pfr., from Zanzibar and south of Cape Guardafui. The operculum as figured is quite like that of *Otopoma*. The perforation in the centre is not important: Mr. Bourguignat shows this also in the operculum of *Otopoma* (*Georgia*) *naticopsis*. It represents the softer portion attaching it to the foot, torn out after the animal has dried up. Neither can *O. conicum* or *O. turbinatum* be placed in *Rochebrunia*—side by side with forms like *coquandianum*, Petit, of Madagascar, for this shell has no

trace of spiral liration; on the contrary, the sculpture is strongly transverse. It is narrowly umbilicated with a *high, well-pointed spire*. Most of the shells included in *Rochebrunia* are of this type. *R. philippiana*, of Madagascar, is also closely umbilicate, not ribbed and banded with colour. The species *coquandianum* has been considered an *Otopoma*; but nothing but an examination of the animal can settle this. I have shown how very different the *radula* of *Otopoma* is from that of *Tropidophora* and *Leonia*, an African genus; and it seems probable that the animals of all the *Cyclotomidae* of this vast African area, with its islands, will fall into one or other of these two groups, which may even now be marked off as the *Otopominae* and the *Tropidophorinae* respectively, while shell character may allow them to be ultimately sub-divided into genera and sub-genera.

Lithidion of typical form is represented on Sokotra and Abd-el-Kuri by four species, two in each island. As Mr. Edgar Smith points out, it is very doubtful whether *L. lithidion* has been found in Arabia; it has not occurred in the latest collections from that side; nor has it been found in Africa or India. On looking over the shells of this group in the Natural History Collection, there is a *Lithidion niveum*, Petit, from Madagascar. If we include shells departing more or less from the typical form, there is *Tropidophora modesta*, Petit, of Abd-el-Kuri, which is a *Lithidion* of a large tumid shape, and even *Tropidophora socotrana* shows a clear approach in its style of sculpture, open umbilication and high spire. Then Mr. Smith places *Guilainia grata* in *Lithidion*, although in this shell the wide umbilicus is no longer a character. I consider, in spite of the similarity of the animals, the form of the shell is sufficient to keep it separate subgenerically.

Cyclotopsis is an Indian genus, represented there by only two species, *subdiscoideum*, Sowerby, from Orissa; and *semistriatum*, Sowerby, in Peninsular India. *C. conoileum*, of the Mauritius, has been put into this genus, and Morelet has described *filiolum* and *uevilli* from Anjouan, one of the Comoro Islands. I described *ornatus* from Sokotra. I may mention that the animals of all the above species are unknown, and until they are examined we cannot feel quite sure they will all be generically alike. The operculum of *C. ornatus* is similar to *Lithidion lithidion*; *Cyclotopsis* may, therefore, turn out to be very near *Tropidophora*. Sokotra on the north is at present the limit of the genus.

Buliminus, Beck.

Sub-gen. Achatinelloides, Nevill.*

The Type of Achatinelloides is *B. socotorensis*, Pfr. The original description of the sub-genus is as follows:—"I suggest the above name for the curious *Achatinella*-like form, distinguished from *Rhachis* by the

* Hand List of Mollusca in the Indian Museum, Calcutta, p. 131.

remarkable distinct fold on the columella, and by its more solid texture ; the oblique raised and regular sculpture is also unusual in the genus."

The dissections of species in this sub-genus were made many years ago from specimens brought home alive by Professor Bayley Balfour, and have been waiting publication in *Land and Fresh-Water Mollusca of India*, together with dissections made of Indian species of the genus, such as *B. (Patraeus) griffithii*, from the Kuram Valley, North-West Frontier of India. As an opportunity now occurs of adding to what is known of the land shells of Sokotra, I give the results here.

Buliminus (Achatinelloides) **balfouri**, *G.-A.* (Figs. h, j.)

Buliminus (Achatinelloides) **socotorensis**. (Fig. i.)

The generative organs are in every respect similar to a typical *Buliminus*, for instance that of *B. (Napæus) montanus*, Drap., of the European area (see fig. 659 in *Monograph of Land and Fresh-Water Mollusca of the British Isles*, by Mr. John W. Taylor, p. 361), the most striking character being the long thin flagellate appendix rising from a long, thickened, and distinct base, opening into the common atrium close alongside that of the penis, from which it seems quite distinct. Its function, whatever it may be, is associated with this organ, indicated by the retractor muscle being common to both, that is, it bifurcates as

FIG. h.

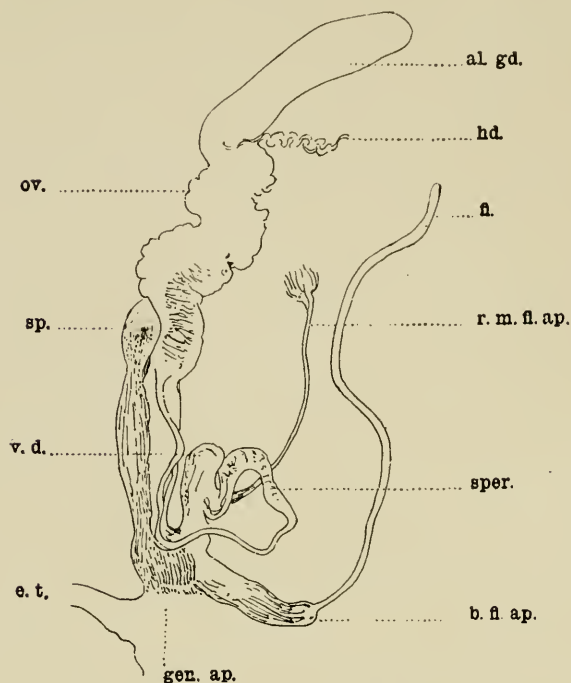


RADULA OF *BULIMINUS* (ACHATINELLOIDES) *BALFOURI*.

is shewn by Mr. Taylor in *B. montanus* and as I observed in both *B. balfouri* and *B. griffithii* of the Panjab. In this Sokotran species the flagellate appendix is basal with regard to the penis sheath ; in the Indian species above-mentioned it is a diverticellum on the side of the penis sheath, given off about half-way between the generative orifice and the penis papilla. Mr. Taylor says "it would appear not improbable that the appendix to the penis sheath of certain Gastropods is homologous with this organ," and it is apparent that if the forked retractor muscles were brought together into one, and the basal tube of the flagellum laid alongside to coalesce with that of the penis so

completely as to become a single tube, we should be presented with the normal form of the flagellate penis in so many genera of the

FIG. i.

GENITALIA OF *B. (ACHATINELLOIDES) SOCOTORENSIS*.

hd., hermaphrodite duct; al. gd., albumen gland; ov., oviduct; sp., spermatheca; fl., flagellum; v. d., vas deferens; sper., spermatophore; b. fl. ap., base of flagellate appendix; r. m. fl. ap., retractor muscle of flagellate appendix; gen. ap., generative aperture; e. t., eye tentacle.

Helicide. The genitalia of the genus *Pupa* is said by Mr. Taylor to be similar to that of *Buliminus montana*. I have not myself examined a sufficiently large number of species in these elongate, close and many whorled genera, to know if there is any indication towards such a course of evolution in the relative closer position to each other of the flagellate appendix and penis; it would be of interest to find such.

A spermatophore is developed, and in the generative organs of *B. balfouri* one may be seen in process of formation (*sper.* fig. i).

In *Buliminus balfouri*, the odontophore formula (fig. h) is:—

21	12	1	12	21
	33	1	33	

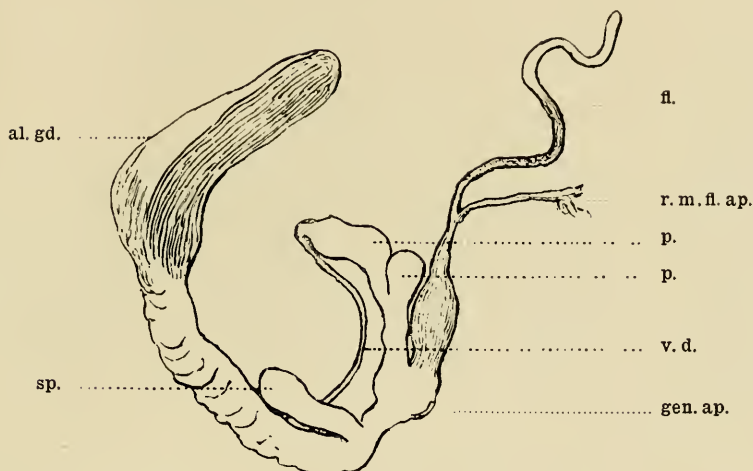
with 111 rows of teeth. The central tooth is tricuspid, short, the point well below the anterior edge of the basal plate; the admedian teeth are bicuspid, with the points also short, this may be due to

wear, for in *B. (Achatinelloides) socotorensis*, Pfr., they are much longer, longer even than the basal plate. The lateral teeth are unevenly bicuspid with another smaller cusp on the exterior side. In *B. socotorensis*, there is generally one long tooth with two smaller on the exterior base. The plates are narrow. The dental formula of this last is:—

18	10	1	10	18
	28	1	28	

98 rows were counted.

FIG. i.



GENITALIA OF *B. (ACHATINELLOIDES) BALFOURI*.

al. gd., albumen gland; **sp.**, spermatheca; **v. d.**, *vas deferens*;
fl., flagellum; **gen. ap.**, generative aperture; **p.**, penis;
r. m. fl. ap., retractor muscle of flagellate appendix.

In my paper on the Land Shells of Sokotra, collected by Professor B. Balfour, I made a few remarks on the past connection of Sokotra with some former and very different distribution of Land and Water in this part of the world. It is not for me to enter on this subject here. It is one which can only be properly treated by those who have seen the country, and on a review of the whole collection.

I would, however, again refer to one point in the generic distribution of the Land Mollusca. Although since 1880 further collections have been made, increasing the number of known species, the remarkable absence of *Helix* still remains true.

PLATE XIII A.

Fig. 1. **GUILLAINIA GRATA**, *Petit.* *Animal, right side, $\times 12$.*

Fig. 1a. *The same, Animal, left side, $\times 12$.*

Fig. 1b. *The same, Animal from above, showing divided foot, $\times 12$.*

Fig. 1c. *The same, Operculum, $\times 12$.*

Fig. 2. **LITHIDION SOULEYETIANUM.** ♀ *Animal from right side, $\times 8$.*

Fig. 2a. *The same, Shell muscle.*

Fig. 2b. *The same, Animal from above.*

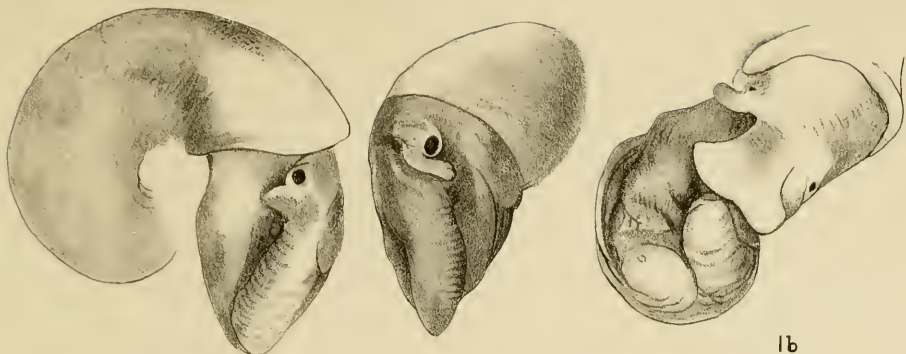
Fig. 2c. *The same, showing anal aperture, $\times 8$.*

Fig. 2d. *The same, from right side, $\times 8$.*

Fig. 2e. *The same, Operculum, $\times 12$.*

Fig. 3. **LITHIDION LITHIDION**, *G.-A.* ♂ *Animal from above, $\times 8$, with the wall of pulmonary sac cut open and thrown back, showing anal orifice and exophalliate male organ.*

Fig. 3a. *The same, Operculum, $\times 12$.*



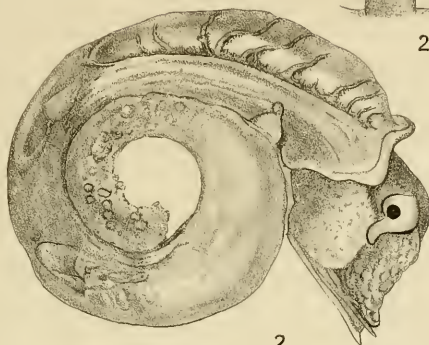
1

1a

1b



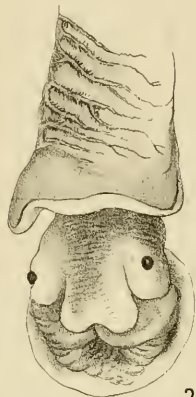
1c



2



2a



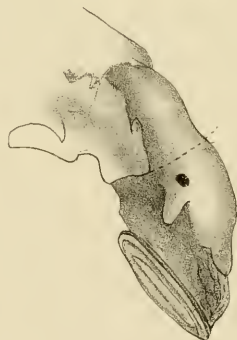
2b



2e



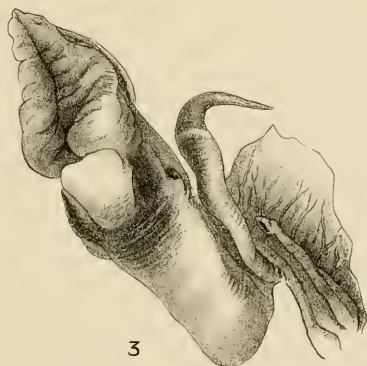
2c



2d



3a



3

ARTHROPODA.

Arachnida.

By R. I. POCKOCK, F.Z.S.

PLATES XIV., XXVI.

Scorpions and Spiders.

The literature of Sokotran Arachnida is at present scanty and scattered. A complete list of the papers that have been written and of the species that have been recorded from the islands of Sokotra and Abd-el-Kuri are given at the end of this report.

The fauna is a mixture of elements showing affinities both with the fauna of the Ethiopian and the Mediterranean areas, the Mediterranean elements on the whole predominating. The Scorpions—a group which furnishes valuable evidence for the determination of geographical areas—are distinctly more Mediterranean than Ethiopian. *Hemiscorpius* and *Butheolus* have their headquarters in the desert countries of South-Western Asia. The one species of *Buthus*, too, belongs to a section of the genus which is represented by several forms in these same countries, has penetrated Africa as far south as the Zambesi, and has reached Cape Comorin in India, though its absence from Ceylon and Burma points to it as a late immigrant into Hindostan. The two Scorpions from Abd-el-Kuri attest the same fact, both being related to the Arabian and Syrian genus *Neba*, and occupying an intermediate stage between the latter and its only other known ally, the Central American *Diplocentrus*. The one Solpugid met with in Sokotra also belongs to a genus known hitherto from Asia Minor, Arabia, and North India. *Argyrops clarkii* is another Mediterranean form. On the other hand, the Mygaloid Spider *Monocentropus*, although peculiar to Sokotra, forms a unit of the sub-family *Eumenophorinae*, which is confined to tropical Africa and Madagascar. *Nephila hymenaea*, too, and the one single known *Gasteracantha* are certainly African and not Mediterranean elements. The same may be said of the two forms of *Latrodectus* and of the one genus of Zodariidae, *Cypheris*. The remaining species of Spiders do not supply very satisfactory evidence either in favour of an Ethiopian or Mediterranean origin of the fauna.

On the negative side it is interesting to note the apparent absence from Sokotra of such forms as the Spiders *Heteropoda venatoria*, *Artema atlanta*, and the Scorpion *Isometrus europæus* (= *maculatus*), which have been artificially introduced by human agency into all tropical and subtropical countries to which commerce has extended.

The Scorpions and Spiders of Sokotra.

SCORPIONES.

BUTHIDÆ.

Buthus, Leach.

1. *Buthus socotrensis*, Pocock.

Prionurus hottentottus, Fabr. ; Taschenberg, Zeits. Naturwiss. (4), ii. p. 173 (1883).

Buthus socotrensis, Pocock, Ann. Mag. Nat. Hist. (6), iii. p. 337, pl. xv. fig. 3 (1889) ; Kraepelin, Das. Tierr. Scorp., etc., p. 20 (1899).

My original description of the Type, with a few emendations, is as follows :—

“Colour very characteristic. The whole body, above and below, with palpi, legs, tail, and cephalothorax uniformly ochraceous, testaceous, or a combination of the two ; the distal end of the chelicerae, the area of the lateral and median eyes and of the anterior cephalothoracic keels, black.

“The *species* bears considerable resemblance to *B. hottentotta* and *B. tamulus*, and undoubtedly appertains to that section of the genus of which *hottentotta* may be regarded as the type.

“*Cephalothorax*.—Much the same shape as in *B. hottentotta*, but the median eyes are larger and considerably more widely separated ; anterior keels not smooth between the eyes, diverging normally in front and joining each other in the middle line of the front edge of the cephalothorax ; the area between them almost smooth. The posterior keels almost parallel, joining, and being in almost the same straight line with the internal median keels, which are consequently themselves nearly parallel, the two on each side constituting only a slightly sinuous line ; the external median keel not prominent and not united by a transverse line of tubercles with the anterior end of the posterior keel, as it is in *B. europæus*. The rest of the cephalothorax sparsely granular.

“*Tergites*.—The first six marked with three keels, although the lateral keels of the first may be represented by a single large granule only ; these keels granular and becoming progressively more expressed from before backwards, the lateral diverging in front, but none of the keels are conspicuous on account of their being of the same colour as the rest of the segment ; keels of the seventh segment like those of, e.g., *B. hottentotta*.

- “*Sternites* as in *B. hottentotta*, except that the four keels of the fifth are of the same colour as the rest of the segment.
- “*Tail*.—Slightly narrowed from base to apex, considerably more shallowly excavated above than in *B. hottentotta*, *B. tamulus*, and *B. judaicus*; upper surface of the fifth segment with a shallow depression in its posterior half. The first four segments provided each with ten keels, for the most part feebly granular; the inferior keels, almost smooth in front, become more granular behind; the superior keels, on the other hand, become less granular behind; the inferior intercarinal spaces smooth behind, and becoming more granular in front; the superior intercarinal spaces sparsely granular behind, more thickly so in front; on the fourth segment the granules of the upper surface are arranged in a definite longitudinal series, and constitute a distinct keel; consequently this segment, having a complete though feeble median lateral keel, is supplied with twelve keels. Fifth segment much like that of *B. hottentotta*, but less narrowed behind and less excavated above; superior keels absent, the segment being merely granular above at the sides; inferior and lateral keels evenly granular throughout and nowhere denticulate; the granules of the inferior intercarinal spaces are arranged on each side in a definite series, thus constituting a keel, so that when viewed from below this segment appears to be furnished with five keels.
- “*Vesicle* large, dilated, its height being as great as, or greater than, its width, and as great as, or a little greater than, the width of the anterior and of the fifth caudal segment; granular beneath; aculeus sharply curved backwards, considerably, or a little shorter than the vesicle; together the two are about as long as the fifth caudal segment.
- “*Palp*.—Humerus almost as in *B. hottentotta*, except that the granules are finer; brachium not costate behind; superior keels very finely granular; anterior keels more coarsely granular. Manus not costate; a little narrower than the brachium and shorter than the dactyli; dactyli long, slender, incurved; the movable dactylus in one specimen about twice the length of the ‘hand-back,’ in the others considerably less so; the movable dactylus furnished with a small basal lobe. External surface of femora of legs granular.
- “*Pectines* (exclusive of the teeth) shorter than the cephalothorax; number of teeth 24-25 (♀), in one specimen 28-29 (♂). All the appendages are hairy, mostly sparsely so, but on the manus and dactyli the hairs are very short, and close-set; the anterior margin of cephalothorax is furnished with a row of hairs, and on the under surface of the tail the hairs are few but symmetrically arranged.
- “Measurements in millimetres of largest specimen:—Total length 76, of tail 44, of cephalothorax 9; width 10; first tail-segment, length $5\frac{1}{2}$, width $5\frac{1}{2}$, height $4\frac{3}{4}$; fifth tail-segment, length $9\frac{1}{4}$, width $4\frac{3}{4}$, height $4\frac{1}{2}$; vesicle, length $6\frac{1}{4}$, width $4\frac{1}{4}$, height $4\frac{1}{2}$; palp, length of

humerus 7, of brachium $8\frac{3}{4}$; width of latter 4; width of hand $3\frac{3}{4}$; length of 'hand-back' $5\frac{3}{4}$, of movable finger $10\frac{1}{2}$; length of pecten $7\frac{3}{4}$."

In the length of the fingers and slenderness of the hand this species somewhat calls to mind the female of *B. tamulus*; but the movable dactylus is furnished with a much more conspicuous basal lobe than in the female of that species. It differs from both *B. hottentotta* and *B. tamulus* in its larger and more widely separated median eyes, in its more widely separated and more parallel posterior cephalothoracic carinae, in its larger vesicle, and, above all, by the additional twelfth row of granules on the superior surface of the fourth caudal segment; this last is, in fact, a characteristic by which it may be separated from, I believe, all the species of *Buthus* that have been hitherto described, although it is at the same time a characteristic which is faintly foreshadowed in the reduplication of the series of granules which constitute the superior keels of the fourth and fifth caudal segments in some of the species allied to *Parabuthus liosoma*.

This Scorpion is extremely abundant in the island. Large numbers were procured by Messrs. Grant and Forbes.

Sokotra: Hadibu Plain; Dahamis (350-1000 ft.); Homhil (1500-2500 ft.); and Jena-agahan (1200-2500 ft.).

Under stones; rarer in tents.

***Butheolus*, Simon.**

2. *Butheolus insularis*, Pocock.

Butheolus insularis, Bull. Liverp. Muss., ii. p. 8 (1899).

Colour.—Tail and upper side of trunk olive-black, appendages rather paler; digits, distal end of legs, and ventral surface, olive-yellow.

Carapace granular, its ante-ocular portion sloped; terga granular, especially along the posterior margin; terga 3-6 tricostate. *Tail* incrassate to middle of fourth segment, inferior surface of segments 1-4 granular and furnished with four strong and granular keels; inferior surface of fourth and fifth smooth, impressed with large but shallow punctures, the former with very short granular keels in front, the latter granular posteriorly, its lateral keels only obsolete in front, upper surface of segments smooth; the first normally keeled, the second with weaker and smoother keels, third, fourth, and fifth punctured at the sides, the two former with scarcely a trace of lateral keels; vesicle punctured; not geniculate beneath the aculeus. *Chelæ* with humerus granular and granularly crested above, brachium smooth, with smooth crests; hand smooth, scarcely crested; digits short, the movable being twice the length of the hand-back, shorter than the carapace, furnished with eight rows of teeth. Movable and immovable digits of *mandibles* furnished with two inferior teeth. Coxæ of *legs* granular; external surface of legs granular and carinate. *Pectinal teeth*, 17.

Total length, 22 mm.

Sokotra : Gebel Raggit (700 ft.).—A single specimen.

Found under a stone in the dry upper parts of the bed of the Hanefu River.

Recognisable at once from the Arabian and Persian *B. melanurus* by the smoothness of the upper caudal crests, &c.

ISCHNURIDÆ.

Hemiscorpius, Peters.

3. Hemiscorpius socotranus, Pocock.

Hemiscorpius socotranus, Bull. Liverp. Muss., ii. p. 8 (1899).

♀ *Colour*.—Olive-brown above; chelæ ferruginous, with crests and digits infusate; legs olive-yellow.

Carapace and tergal plates densely punctured; very finely and closely granular laterally and in the median depression; coxæ and sterna finely punctured. *Tail* about four times as long as the carapace; superior and inferior lateral keels strong and granular on all the segments; median lateral keel absent on first and all the following segments, except the fifth, where it is posteriorly abbreviated; inferior lateral keels distinct on all segments, but weakly granular on the anterior; inferior median keel absent on segment 1, present in the posterior half of segment 2, developed on segments 3-5; intercarinal spaces finely granular; vesicle finely and coarsely punctured, finely granular. *Chelæ* very finely and closely punctured; hand nearly flat above, with smooth external finger keel and median longitudinal keel. *Legs* punctured and finely granular. *Genital operculum* broadly cordate, without median suture, except in front. *Pectinal teeth* 10.

♂ Differing from ♀ in its more slender build, longer tail, and much more strongly granular upper surface of body and chelæ. Carapace as long as first and half the second caudal segments. Tail about five times as long as carapace, its fifth segment much longer than carapace; vesicle more elongate than in ♀. Pectinal teeth 12-13.

Measurements in millimetres—♀ Total length 38, length of tail 19·5, of carapace 5, fifth segment of tail 4·5. ♂ Total length 38, length of tail 22, of carapace 4·2, fifth segment of tail 5·2.

Sokotra : Hadibu Plain; Jena-agahan (1200-2500 ft.); Adho Dimellus (3500-4500 ft.).

Under stones.

Recognisable from the Arabian *H. lepterus* by the obsolescence of the median inferior keel on the first and second caudal segments, etc.

SOLIFUGÆ.

SOLPUGIDÆ.

Gluviopsis, Knaep.

4. Gluviopsis balfouri, Pocock.

Paracoleobis balfouri, Pocock, Ann. Mag. Nat. Hist. (6), p. 95 (1895).

♀ *Colour* entirely pale yellow, with the exception of the black ocular

tubercle, black mandibular fangs, and a broad black band round the distal half of the tibia of the palp; distal extremity of the tarsus pale.

Carapace with its anterior border lightly convex; tubercle with a series of hairs surrounding the eyes on the inner side and a cluster in front, of which two are stronger than the rest; space between the eyes about equal to a diameter.

Mandibles with long, sharply defined, stridulating ridges; the lower jaw dentate, somewhat as in *P. dorsalis*, but in the upper the anterior two teeth are large and sub-equal, as large, in fact, as the fourth—the third, fifth, and following ones being small.

Palp with its tibia studded below with two series of longish spines.

Measurements in millimetres.—Total length, 16; width of head 4, length 3; length of mandible 5.3, of palp 12, its protarsus and tarsus 4, of fourth leg 18.

Sokotra.—(*I. B. Balfour.*)

ARANEÆ.

MYGALOMORPHÆ.

THERAPHOSIDÆ.

EUMENOPHORINÆ.

Monocentropus, Pocock.

Monocentropus, Pocock, Proc. Zool. Soc., 1897, p. 758.

Carapace oval, longer than wide; fovea shallow, transverse, wider than ocular tubercle; tubercle small, subcircular; eyes of anterior row somewhat strongly procurved, of posterior row recurved; clypeus very narrow.

Mandibles without external scopula; a single row of teeth below; the posterior portion of the lower surface weakly granular.

Labium a little wider than long; its border granular like the inner angle of the maxilla.

Sternum oval, longer than wide; the posterior sigilla distinctly removed from the margin.

Legs: tarsal scopulae entire; protarsal scopulae also undivided, except partially so on the fourth; on the first and second legs, extending practically to the base of the segment; covering about two-thirds of the segment on the third leg and half on the fourth; legs unarmed, except for a pair of spines at the tips of the tibiae and protarsi beneath; length 4, 1, 2, 3; patella and tibia of fourth about equal to those of the first; claws unarmed. *Spinners* considerably more than half the length of the carapace.

Tibia of ♂ armed with a single spine-tipped tuberculiform process.

5. *Monocentropus balfouri*, Pocock. (Plate xiv. fig. 1.)

Monocentropus balfouri, Proc. Zool. Soc., 1897, p. 758, pl. xli. figs. 1, 1a.

Colour.—Carapace covered with olive-yellow pubescence, showing pinkish tinge towards the margin; legs covered with olive-brown hairs; the base of the femora and upperside of the trochanters greyish-white; the lower side of the femora clothed with whitish or yellowish-white hairs and contrasting very forcibly in colour with the chocolate-brown tint of the coxæ and of the segments on the distal side of the femora; abdomen furnished with long greyish-red hairs at the side, black beneath.

Carapace moderately convex, its cephalic area not strongly elevated; a little longer than the fourth protarsus, shorter than patella and tibia of fourth leg.

Eyes not very unequal in size; the anterior medians if anything the smallest, distinctly smaller than the anterior laterals, and separated by a space that about equals their diameter, a little nearer to the anterior laterals; a straight line touching their front borders cutting near the centres of the laterals; posterior median about as large as the posterior lateral and closer to it than to the median.

Tibia of ♂ armed with a low tuberculiform process beset with two tufts of rigid lanceolate spines; the lower surface of the anterior two pairs of femora as well as the femur of the palp furnished externally with long thickly-set hairs, tibia of palp also thickly hairy below; tarsus of palp apically thickly scopulate; the bulb globular, the lightly arcuate spine rising abruptly from its posterior portion.

Measurements in millimetres.—Total length 34; length of carapace 16, width 13; length of first leg 50, of second 47, of third 45, of fourth 53; patella and tibia of first 18·8, of second 16·5, of third 15, of fourth 18.

Sokotra: Homhil (1500-2500 ft.); and Adho Dimellus (3500-4500 ft.). Collected also by Prof. Balfour and Mrs. Bent.

All the known specimens of this spider, the largest found in Sokotra, are males that have been met with wandering about after dark in search of females. The latter, no doubt, live in burrows, and have on that account eluded up to the present time the search of collectors. The example captured by Mrs. Bent was caught in the tent at night. One of the other specimens was met walking along a steep path in the bush at about 5·30 p.m. Instead of attempting to escape by flight, it immediately rose up in an attitude of defence, showing fight in the manner depicted on the Plate referred to above.

BARYCHELIDÆ.

Atrophothele, gen. nov.

Carapace low; eyes aggregated on a tubercle; the ocular area a little wider than long and a little narrowed anteriorly; anterior medians

close to edge of clypeus subequally separated from each other and from the posterior laterals, the spaces between them slightly exceeding the long diameter of an anterior lateral eye; posterior laterals and posterior medians subequal, much smaller than the remaining eyes; anterior medians a little more than a radius apart and a little less than a diameter from the anterior laterals. *Rostellum* scarcely developed, merely represented by about a dozen irregularly arranged long, curved, stout, but apically filiform bristles. *Labium* wider than long, with a row of about six cusps along its border; *maxille* studded basally with cusps, about twenty in number, arranged anteriorly in about three rows. *Legs* slender, anterior pairs and palpi scantily spined; posterior pairs more strongly spined; scopulae scanty. *Anterior spinners* very small, quite short and slender, set close together in the middle line.

Type *A. sokotrana*.

In the small size of its anterior spinners this genus lies midway between *Diplothele* and the rest of the genera of the family *Barychelidae*. Other distinguishing features are the weak rostellum, the straight thoracic fovea, cuspluate mouthparts, and small posterior lateral eye.

6. *Atrophothele sokotrana*, sp. n.

Colour: carapace deep ruddy-brown, scantily clothed with silky-yellow hairs; legs pale orange yellow; abdomen pale olive grey.

Carapace about one-fourth longer than wide, its length about equal to patella and tibia of fourth leg, longer than patella and tibia of first leg. *Palpi* with tibia armed internally with about three spines. *Legs*: first leg unspined, except for two spines at the base of the protarsus, and a few stout bristles on the underside of the tibia; second leg armed like the first, but the bristles on the tibia shorter, one of them being spiniform; third leg absent; fourth leg with about half a dozen spines on the underside of the tibia, three being apical; one posterior spine on the patella, and many strong spines and spiniform bristles on the protarsus; scopulae scanty; protarsal scopula of first leg scarcely reaching, that of second not reaching, base of segment; absent on fourth leg; tarsal scopulae divided by band of setae, the divisional line indistinct mesially on the tarsus of the palp and first leg, distinct throughout on the second leg, and so broad on the fourth leg as to occupy the whole of the lower surface of the segment, the scopula being represented by only a few hairs at the sides of the segment; claws armed with from one to two teeth placed near the middle of their length.

Measurements in mm.:—Total length 14, carapace 5.5, first leg 13, second 11, fourth 17.

Sokotra: Jena-agaban (1200-2500 ft.). A single female specimen found under a stone in dry bed of torrent below the camp.

ARACHNOMORPHÆ.

THERIDIIDÆ.

Latrodectus, Walck.7. *Latrodectus geometricus*, C. Koch.

Latrodectus geometricus, C. Koch, Die Arachniden, viii. p. 117, fig. 684 (1841); Simon, Ann. Soc. Ent. France (6), x. p. 99 (1890); id. Hist. Nat. Araign, i. p. 569 (1894).

Sokotra: Dimichiro Valley; Homhil (1500-2500 ft.).

This species occurs in the tropics of America and Africa, in Arabia, and as far east as Karachi, on the border of Hindostan.

8. *Latrodectus tredecem-guttatus*, Rossi.

Aranea tredecem-guttata, Rossi, Fauna Etruscæ, ii. p. 136, pl. ix. fig. 10 (1790); Thorell, Synonyms of European Spiders, p. 508 (1873) (for synonymy).

Specimens of the black variety of this species (var. *erebus*) were taken.

Sokotra: Hadibu Plain.

Argyrodes, Simon.9. *Argyrodes argyrodes* (Walck.).

Linyphia argyrodes, Walck., Ins. Apt., ii. p. 282 (1837).

Argyrodes argyrodes, Simon, Arachn. de France, v. p. 16 (1881).

Sokotra: Dahamis (350-1000 ft.); Homhil (1500-2500 ft.); Adho Dimellus (3500-4500 ft.).

Widely distributed in the tropics, where it follows the distribution of *Cyrtophora citricola*, with which (according to Simon) it lives commensally.

ARGYOPIDÆ.

Tetragnatha, Latr.10. *Tetragnatha boydi*, O.P. Cambr.

Tetragnatha boydi, O.P. Cambridge, Proc. Zool. Soc., Lond., 1898, p. 389, pl. xxxi. fig. 4.

Adult female, length 4 lines: length of cephalothorax 2 lines; length of palps $2\frac{1}{4}$ lines nearly.

Cephalothorax oblong-oval, truncated at each extremity, and widest near the middle; length double its breadth; lateral marginal impressions of caput very slight; caput and margins of thorax darker than the rest; yellow-brown, but in the dry specimen the colour is unreliable.

Eyes of posterior row equally separated; in a very slightly curved line, the convexity of the curve directed forwards; anterior row much more strongly curved, but with the same direction of the curve; central quadrangle slightly broader than long, and the fore side distinctly shorter than the hinder one; the fore-central pair of eyes longest, and seated on a strongish rounded tubercular prominence;

each of the lateral eyes also on a tubercle. The eyes of each lateral pair are much nearer to each other than the fore-central pair are to the hind-centrals. *Clypeus* rather less in height than half the facial space.

Falces very long and projecting forwards, slightly longer than the cephalothorax; considerably divergent; slightly curved, rather constricted at the fore extremity. Fang more than three-fourths the length of the falx, strong, abruptly bent at the base where it is somewhat enlarged, and there is another somewhat shallow dentiform enlargement towards the middle on the inner side; and each of the falces is armed with a strong, somewhat curved, pointed tooth at its extremity, just below the outer side close to the insertion of the fang; also on the inner side nearly beneath the base of the fang is another strong sharp-pointed tooth; besides these teeth each falx has a double longitudinal row of others along the underside; those on the outside are most numerous (10?) and more equally separated, the inner ones (7 or 8?) strongest and more confined to the posterior portion of the falx, those of both rows diminishing in strength as they run backwards.

Legs very slender; 1, 2, 4, 3, very little difference between 2 and 4; furnished with hairs and a few short slender spines.

Maxillæ, labium, and sternum normal.

The abdomen was so shrivelled and devoid of colour that nothing can be said as to its colours or markings, which, however, are most probably distinctive of the species.

This Spider is nearly allied to *Tetragnatha taylori*, Cambr. (South Africa), but the relative position of the eyes is different, as well as the form of the fang and the denticulation of the falces.

Sokotra.—(*E. W. Bennett.*)

11. *Tetragnatha granti*, *sp. n.*

Colour: carapace, legs, and mouth parts ochraceous, clouded with black; carapace with two broad submedian fuscous bands and with stripes radiating from the fovea to the fuscous lateral border; mandible with broad external fuscous stripe; legs banded and spotted; maxillæ banded; sternum and labium blackish, border of the former pale and clear; abdomen olive grey studded with silvery spots, the upper side furnished with two rows of spots and lines forming an irregular interrupted lateral band, the ventral surface adorned with three—a median and two lateral—dark bands, separated by two narrower silver-spotted stripes, which start—one on each side—from the pale pulmonary opercula, the lateral dark bands extending on to the sides of the abdomen, with external border sinuous.

Carapace about half the length of the femur of first leg, less than half but more than one-third the length of patella and tibia, almost as long as tibia of fourth, and as patella, tibia, and half the protarsus of the third.

Eyes of posterior line subequal, subequally spaced, slightly recurved, about two diameters apart; ocular quadrangle very slightly wider behind than in front, about as wide as long; anterior median eyes larger than posterior medians, about a diameter apart and above the clypeus, considerably more than a diameter from the laterals, which are much smaller and stand higher, their upper edges in a line with those of the medians, their lower edges in a line with the centres of the latter; hence the eyes of the anterior line which is as wide as the posterior are recurved, the two lateral eyes on each side about as far apart from each other as are the anterior and posterior medians.

Mandibles short, fusiform, about half the length of the carapace; armed below with two rows of nine teeth each, the teeth start at the articular socket of the fang and extend about half way up the jaw, decreasing in size proximally, the teeth of the anterior (upper or outer) row extending farther than the others owing to the wider-spacing of the distal teeth. Fang short, unmodified, extending, when closed, barely half way back along the basal segment. *Murille* about three times as long as the labium, and rather more than twice as long as their distal width.

Legs 1, 2, 4, 3 (*cf.* measurements): sparsely and weakly aculeate.

Abdomen subcylindrical, higher anteriorly than posteriorly, a little narrowed posteriorly, ending in a bluntly rounded supra-anal prominence: genital orifice more than one-third but less than one-half way along the ventral surface of the abdomen, and nearly as far from pulmonary stigmata as the latter are from the anterior end of the abdomen.

Measurements in mm.—Total length 11, carapace 4, first leg 24, second 15, third 6.5, fourth 1.3.

Sokotra: Dahamis (350-1000 ft.).

By the arrangement of its eyes, this species apparently falls into section *c* of Simon's division of *Tetragnatha*, but differs from the rest of the species in having the legs sparsely and weakly spinose, as in section *a*. (*Hist. Nat. Araign.* I., p. 723, 1894).

This specimen was taken while sitting with legs extended in its web made over a running stream.

Two known Sokotran species of this genus, of which only the females have been described, may be diagnosed as follows:—

- (*a*) Basal segment of mandible longer than carapace ($2\frac{1}{4}$:2), toothed nearly to the base along the posterior border of the fang groove, the teeth of this row widely spaced distally, the distal tooth of each row much larger than the rest and projecting above and below the base of the fang; fang about three-quarters the length of the basal segment, sinuous, abruptly bent at the base, and with an anguliform tooth near the middle of its biting edge.

boydi.

- (b) Basal segment of mandible about half the length of the carapace; toothed in the proximal half, the teeth of the posterior row evenly and closely set starting from socket of fang; distal teeth of each row only a little larger than the rest; fang short, about half the length of the basal segment, evenly curved, unarmed *granti*.

Argiope, Aud.

12. *Argiope clarkii*, Blackw. (Plate xiv. figs. 3, 3a, 3b, 3c.)

?*Aranea sector*, Forskal, Icones rerum nat., &c., p. 85, pl. x xv. fig. c (1775).

Argiope clarkii, Blackw., Ann. Mag. Nat. Hist. (3), xvi. p. 98 (1865).

Argiope sericea var. *caboverdiana*, Brit. Capello Journ. Ac. Sc. Lisbon, i. p. 82, pl. ii. fig. 1f (1868).

Argiope lordii, O.P. Cambridge, Proc. Zool. Soc., 1870, p. 820, pl. 1. fig. 1.

Argiope fissiloba, L. Koch, Egypt, Abyssin., Arachn., p. 15, pl. ii. fig. 1 (1875).

Not *Argiope clarki*, Simon, Ann. Soc. Ent. France (6), x. p. 101 (1890).

This species has a wide range throughout the southern half of the Mediterranean area, extending from the Cape Verde Islands, whence the type of *A. clarkii* was collected, to Abyssinia (*A. lordii* and *A. fissiloba*), thence into Arabia, Sokotra, and as far east as Bushire on the Persian Gulf. The female may be at once recognised from the females of the rest of the species forming the group of which *A. sericea* is the type, by the form of the vulva (Pl. xiv. fig. 3b), in which the 'carina' and the two cavities, when viewed from below, are completely roofed over and overlapped posteriorly by a rugose convex plate, of which the posterior border is smooth, thickened and notched in the middle, the thickening of the border being emphasised by a pair of deep submarginal grooves which sometimes extend so as to circumscribe a median eminence situated at the apex of the posterior notch. Both the eminence and the notch vary considerably in degree of development in specimens from the same locality.

The Types of both *A. clarkii* and *A. lordii* are in the possession of the Rev. O. P. Cambridge, and I am indebted to Mr. F. Cambridge for an examination of the vulvæ of the two which confirmed their specific identity—a conclusion of which I had already surmised the accuracy from examining a large series of the species from the Cape Verde Islands, Arabia, and Persia. The species identified by Simon as *A. clarkii* is evidently not the same form since he compares it with *A. nigro-vittata* of Thorell. According to Simon *A. sector* of Forskal is identical with his *clarkii*. *A. sector* may, however, be equally well identical with the true *A. clarkii*.

The male and female of this species, which is very abundant in Sokotra are figured side by side on the above-quoted plate.

The male is much smaller than the female. The carapace has a median pale band covered with silvery hair, and a pale margin, the rest of its area being brown; upper side of abdomen covered with an olive brown field with a sinuous black external border and a median pale band adorned with silvery hair; the sides of the abdomen are yellowish above, deep brown below, the two colours sharply contrasted; the outer surface has a silvery white band on each side, separated by a median deep brown stripe bordered externally with black; sternum black with median silvery band; legs yellow spotted with black. Abdomen at least twice as long as wide, without lateral lobes, but with a longish conical caudal process.

Total length—♂ 9 mm., ♀ up to about 25 mm.

Sokotra.—(*Balfour*). Gebel Raggit (600 ft.); Jena-agahan (1200-2500 ft.); Hadibu Plain; Dahamis (350-1000 ft.); and Homhil (1500-2500 ft.); also Abd-el-Kuri.

Nephila, *Leach*.

13. *Nephila sumptuosa*, *Gerst.* (Plate xiv. figs. 2, 2a, 2b.)

Nephila sumptuosa, Gerstäcker, in Von der Decken's Reisen in Ost. Afrika, iii., 2, p. 501, pl. xviii. fig. 12 (1873); Pocock, Ann. Mag. Nat. Hist. (6), xviii. p. 182 (1896).

Nephila bennetti, O.P. Cambridge, P.Z.S., 1898, p. 387, pl. xxxi. fig. 2.

Sokotra.—(*Balfour and Bennett*). Homhil (1500-2500 ft.); Dahamis (350-1000 ft.); and Jena-agahan (1200-2500 ft.).

This species is not uncommon in Sokotra. It was collected in considerable quantities both by Professor Balfour and by Messrs. Grant and Forbes. Mr. Bennett also procured a specimen which served as the type of *Nephila bennetti*, O.P. Cambridge.

Although *N. sumptuosa* is an extremely abundant species in East Africa, extending from Somaliland to Natal, and was recorded from the island of Sokotra in 1896, Mr. Cambridge unfortunately makes no comparison between this species and the Sokotran form he named *bennetti*. There appears, however, to be no justification for regarding the latter even as a distinct subspecies.

The material collected by Messrs. Grant and Forbes contains both males and females. A specimen of the female has been figured (Pl. xiv. fig. 2) to illustrate a very conspicuous element in the Sokotran fauna. The diminutive male which has, I believe, never been described, is also figured for comparison with the female. Its essential structural features may be diagnosed as follows:—

♂. Prevailing colour yellow, clouded with black. *Legs* armed with long spines, the tarsi, protarsi, and underside of tibiae clothed with short, close-set stiff hairs.

Ocular quadrangle about as wide as long, the anterior median eyes much larger than posterior medians, less than a diameter apart, posterior

medians little more than a diameter, much nearer to each other than to the laterals; eyes of posterior line straight: laterals smaller than medians; eyes of anterior line strongly recurved. *Palp* with patella globular, armed above with a long bristle: tibia about as long as the patella, wider than long, the bulb black, globular, the spine long, unjointed and sinuous.

Total length 8 mm.

[This handsome species was particularly numerous below our camp at Homhil, the bushes bordering the reedy bed of the stream being covered with its great webs. These are of so strong a texture that when one accidentally walks through a web suspended between two bushes one can feel and hear the net tear as one passes through it.—*W.R.O.G.*]

Araneus, Clerck.

14. *Araneus hoplophallus*, Pocock.

Araneus hoplophallus, Pocock, Bull. Liverp. Muss., ii. p. 40 (1899).

♂. *Colour*: Carapace and legs yellowish-red, the latter marked with deep brown transverse bands and armed with spines, mostly white with black tips, except those on the front of the tibia of the second leg, which are nearly black throughout; upper side of abdomen mottled with olive black spots and marks on a greyish ground; the anterior area between and in front of the shoulder points marked mesially with an olive black stripe which behind is continuous with a transverse, slightly procurved band of the same colour extending between the shoulder points; no pair of circular white marks on this area; the rest of the dorsal surface marked with narrow transverse olive-



PALPUS (*magnified*) OF
ARANEUS HOPLOPHALLUS.

black lines, with their extremities curved forward and bordered behind by a paler line. Structurally the type of this species is very closely allied to the males of *A. streptoceros*, Poc., from Rhodesia and Nyassaland (Ann. Mag. Nat. Hist. (7), ii. p. 436, 1898), and to *A. cyrtoscapus*, Poc., from Natal (Ann. Mag. Nat. Hist. (7), ii. p. 206, 1898), but differs from them in the structure of its palpal organs, as is shown in the accompanying illustration.

Total length 11 mm.: length of carapace 6.

Sokotra: Adho Dimellus (3500-4500 ft.).

A single male example.

This species was based upon a single male example. Since describing it, I have seen a specimen from Abian in S. Arabia, collected by Mr. A. B. Percival, and one from Berbera in North Western Somaliland, collected by Mr. C. V. A. Peel (see *P.Z.S.*, 1900, p. 52). These discoveries lend considerable probability to the view that *A. hoplophallus* is founded on the hitherto unknown male of *A. suedicola*--a species originally recorded by Simon from Aden (*Ann. Soc. Ent. Fr.*, 1890,

p. 103); and subsequently from Somaliland by Pavesi (*Ann. Mus. Genova*, xxxv. p. 498, 1895).

15. *Araneus cardioceros*, Pocock. (Plate xiv. fig. 4.)

Araneus cardioceros, Pocock, Bull. Liverp. Mus., ii. p. 40 (1899).

♀. *Colour*: carapace yellow, with a black clypeal band, and an obliquely longitudinal arched stripe on each side of the head; mandibles yellow, clouded with black in front; palpi and legs yellow, clothed with white hairs, armed with black spines, and banded with black; sternum bordered with black; abdomen greyish white above, marked with distinct olive green "folium"; ventral surface with two whitish bands, separated by a narrower dark interspace, extending from the epigastric fold to the spinners, which are blackish.

Carapace about as long as tibia of first leg; moderately high, its upper surface from the ocular area to the apex of the fovea nearly flat longitudinally; median quadrangle of the *eyes* considerably wider in front than behind, the anterior medians perhaps a little larger than posterior medians, the latter about a diameter and a half apart; anterior medians about two diameters apart, about a diameter above the clypeus, more than twice as far from the laterals as from each other; eyes of the anterior line distinctly though not very strongly procurved; the two laterals not quite in contact. *Legs* spined; abdomen heart-shaped, a little longer than wide, convexly rounded in front, with prominent but obtuse shoulder points from which the two sides of the anterior margin are inclined forward and inwards at a right angle; posterior extremity not produced. *Tula* consisting of a vertically directed heart-shaped tubercle, without any distinct scape.

Total length 7 mm.; carapace less than 3; width of abdomen 4, length 4.5. Sokotra: Adho Dimellus (3500-4500 ft.); Jena-agahan (1200-2500 ft.); and in Abd-el-Kuri Island.

Cyrtophora, Sim.

16. *Cyrtophora citricola* (Forsk.).

Aranea citricola, Forskål, Icones. rerum. nat., &c., p. 86 (1775).

Epeira opuntiae, Dufour, &c.

Sokotra: Homhil (1500-2500 ft.); Dimichiro Valley, in the Garieh Plain.

[This species, which is by no means common in Sokotra, makes a curious circular concave web very different from that of any other species I have observed. In the Dimichiro valley I came across several webs placed in thick "yew-like" bushes, and apparently occupied by only one individual; but at Homhil a web in a boxwood bush contained, so far as I recollect, at least eight examples of various sizes.—*W.R.O.G.*]

This species is of common occurrence throughout Africa, the Mascarene Islands, and the Oriental Region. It also extends into Arabia and S. Europe.

Gasteracantha, Sund.

17. *Gasteracantha sodalis*, O. P. Cambridge.

? *Gasteracantha lepida*, O. P. Cambridge, Proc. Zool. Soc. Lond., 1870, p. 821, pl. 1. fig. 2; L. Koch, Egypt. Abyssin. Arachn., p. 11, pl. i. fig. 4 (1875); Simon, Ann. Soc. Ent. Fr. (6), x. p. 100 (1890).

Gasteracantha sodalis, O. P. Cambridge, Proc. Zool. Soc. Lond., 1898 p. 388, pl. xxxi. fig. 3 (= *G. lepida*, Taschenberg Zeit. Naturwiss. (4), ii. p. 173 (1883).

I have reserved for the Sokotran species of *Gasteracantha* the name given to it by Mr. Cambridge in 1898, although Sokotran examples were identified as *G. lepida*, Cambr., by Taschenberg, in 1883. Taschenberg's identification is, I think, probably correct; but I have no genuine specimens of *G. lepida* available for comparison with the Sokotran material. There are, moreover, certain discrepancies between the figure and description of *G. lepida*, which make it impossible to determine with certainty the characters of the species. Both description and figure cannot be correct; either may be, or neither may be. *G. lepida* was recorded originally from Massowah, and subsequently by L. Koch and Simon from the neighbouring island of Cheikh-, Scheeh-, or Saik-Said. The figure of the species given by L. Koch, represents an animal resembling the typical form of *L. sodalis* in colour, but the spines are longer, and the interval between the anterior and median spines much greater. According to Simon, however, this interval is much smaller than it is represented to be by Koch. Unfortunately Mr. Cambridge, who possesses the types of the two forms under consideration, makes no comparison between them in his description of *L. sodalis*, but compares the latter to *L. madagascariensis*, Vinson.

The typical form of the Sokotran species has the abdomen yellow above, and banded with deep red transverse stripes, the underside being black and thickly marked with large yellow spots which often anastomose. Of almost equally common occurrence, however, is a second type, in which the upper side of the abdomen is of a tolerably uniform dark red or nearly black colour, without trace of bands, the underside being almost black and unspotted. The two forms occur together in the same locality, but do not appear to differ in any structural points. The species is evidently common in the island. Messrs. Grant and Forbes secured specimens.

Sokotra: Dahamis (350-1000 ft.); Homhil (1500-2500 ft.); Jena-agahan (1200-2500 ft.); and Adho Dimellus (3500-4500 ft.).

[A common species on most of the higher bush-clad ground. No two individuals appear to be exactly alike, and every intermediate type was observed between the barred form and those with the abdomen uniform dark crimson or blackish. The web is almost always placed in bushes about 4 or 5 feet from the ground.—*W.R.O.G.*]

AGELENIDÆ.

*Agelena, Walck.*18. *Agelena pusilla*, *sp. n.*

Colour: integument of carapace yellow with radiating black lines and patches; sternum black; palpi yellow with black wings; legs mostly black varied with yellow rings or patches; tarsi wholly yellow and yellow predominating on the coxæ; abdomen with a median dorsal pale band bordered with black; spotted and lined with black on the sides; ventral surface clouded with black and marked with two black lines extending backwards from the genital fold, hairy coating of carapace forming a median and on each side a lateral white band, the legs and abdomen also varied with white plumose hairs.

Ocular quadrangle oblong, nearly parallel-sided, the anterior median eyes larger than posterior medians, less than a radius apart; posterior medians more than a radius apart. *Mandible* armed with two teeth on the posterior border of the fang groove. Area of *vulva* bordered behind by a lightly procurved thick horny transverse bar, the excavation undivided, slightly wider than long, slightly wider in front than behind, its margins low and not sharply defined, except antero-laterally, where they are strongly raised and sharp.

Total length 6 mm.

Sokotra: Jena-agahan (1200-2500 ft.).

This species, remarkable for its small size, may be recognised by the form of the vulva.

LYCOSIDÆ.

*Pardosa, C. Koch.*19. *Pardosa spilota*, *sp. n.*

♀ *Colour*: carapace and sternum blackish, scantily dotted with whitish hairs; legs banded black and yellow; abdomen black above and laterally, ornamented above with symmetrically disposed yellow spots, which posteriorly unite in the middle line and form transverse A-shaped bars; ventral surface testaceous; lower surface continuously clothed with white hairs, upper surface ornamented with spots of white hairs.

Vulva consisting of a large semi-circular hairy punctured plate, which in its posterior half is marked with a deep excavation broad behind and abruptly narrowed in front; its edges, which are sinuous, ending behind on each side in a rounded lobe, the middle of the excavation occupied by a large backwardly directed lobe, which is itself impressed by a pair of parallel longitudinal pits, separated by a median carina. The median lobe represents the normal hammer-shaped sclerite of the lycosine vulva, with the head of the hammer large and its two halves strongly recurved.

♂ smaller than ♀, with the patella, tibia, and base of tarsus of palp snow

white, the rest of the tarsus jet black. Tarsus of palp long, as long as tibia and patella and much broader, the tarsus and palpal organ together elongate and basally globular.

Measurements.—♀, total length 7·5, carapace 3·5, first leg 10·0, fourth leg 14·0 mm.

Sokotra: Hadibu Plain; Dimichiro Valley, in the Garieh Plain.

PALPIMANIDÆ.

Scelidomachus, Pocock

Scelidomachus, Pocock, Bull. Liverp. Muss., ii. p. 41 (1899).

Genus of the section *Cheulinæ* with the lateral eyes in contact, and allied to *Steriphopus*, *Bougrius*, and *Saraseelis* in having the anterior median eyes at least twice as large as the laterals, and the ocular quadrangle nearly parallel-sided; also further resembling *Steriphopus* in having the quadrangle nearly square (in *Bougrius* and *Saraseelis* it is much wider than long), but differing from it in having the eyes of the anterior line straight by their inferior borders, not recurved, and the anterior median eyes separated by a space which barely equals their radius (in *Saraseelis* the space equals the diameter of the eye).

20. *Scelidomachus socotranus*, Pocock. (Plate xxvi. fig. 3.)

Scelidomachus socotranus, Pocock, Bull. Liverp. Muss. ii., p. 41 (1899).

♂ *Colour*: carapace and sternum deep red, legs of first pair paler yellowish-red, those of the remaining pairs still paler, abdomen of a uniform reddish-grey or testaceous tint.

Carapace coriaceous above, closely granular at the sides, its upper surface between the eyes and the fovea lightly convex longitudinally, scantily clothed with short black hairs. *Legs* normal for the family; femur and patella of first pair sparsely but distinctly granular beneath and on the inner side; tibia, protarsus, and tarsus normally scopulate on the inner side; the protarsus, which is about as long as the tarsus, armed apically beneath with a short downwardly-directed spiniform process; second, third, and fourth legs unspined, covered with greyish-black hairs, the tarsi and protarsi apically scopulate. *Sternum* granular; abdomen thickly covered with a coating of short olive-grey hairs. *Palpus* (see accompanying figure) with femur slender; patella short, subglobular; tibia much larger than patella, twice its length, and nearly or quite three times its height, also subglobular; tarsus almost as long as patella and tibia taken together, slender and cylindrical distally; the palpal organ running out into a forwardly-directed process with a dilated tridentate extremity; a membranous lobe at its base, and a subspirally twisted shorter piece on its inner side.



PALPUS OF
SCELIDOMACHUS
SOCOTRANUS.
(Highly magnified.)

Total length 6 mm.

Sokotra: Dahamis (350-1000 ft., *Type*); Jena-agahan (1200-2500 ft.).

ZODARIIDÆ.

Capheris, Simon.**21. Capheris insularis, Pocock.** (Plate xxvi. figs. 4, 4a.)

Capheris insularis, Pocock, Bull. Liverp. Mus., ii., No. 2, p. 41 (1899).

♀. *Colour* : carapace deep castaneous ; legs infusate, banded and mottled with paler markings ; protarsi and tarsi yellowish ; abdomen deep greyish-black above and at the sides, and variegated with pale yellow spots, which posteriorly and laterally arrange themselves in definite transverse and vertical stripes ; lower side yellowish-white, with two black stripes running longitudinally from the epigastric fold and dividing the pale field up into three broad yellow bands ; area in front of sternum black.

Carapace high, higher in front of the fovea than on the ocular area.

Eyes apparently arranged and practically of the same relative size and distance apart as in the only other species of the genus, the South African *Capheris crassimanus*, Sim. (see Simon, Hist. Nat. Araignées, Vol. I., p. 417 figs. 383 and 384). *Legs* longish and rather slender ; first and second pairs unarmed, except for a single apical spine on the lower side of the second protarsus ; third and fourth pairs with patella, tibia, and protarsi strongly spined, the patella with one pair of spines only, the tibia and protarsi with many. *Palpus* with the tarsus strongly spined inside and beneath, very slightly longer, or, at all events, not shorter than the tibia, and not conically acuminate. (In *crassimanus* the tarsus is shorter than the tibia, and acuminate). *Vulva* consisting of a large, hairy, horny plate, with a pair of impressions in front, and a smooth, transversely semi-circular, or subquadrate lobe projecting from its posterior border.

Total length 11 mm.

Sokotra : Homhil (1500-2500 ft., *Type*) ; Dimichiro Valley, in the Garieh Plain.—An adult ♀ and an immature ♂.

CLUBIONIDÆ.

Chiracanthium, Koch.**22. Chiracanthium socotrense, sp. n.**

♂ *Colour* : cephalothorax and limbs a rich yellowish ; abdomen olive-yellow ; both clothed with greyish-white hairs ; mouth-parts rather darker than carapace. *Carapace* about as long as tibia of fourth leg. *Eyes* of posterior line very slightly procurved, subequal in size and subequally spaced, the medians only a little closer to each other than to the laterals, barely two diameters from the laterals ; ocular quadrangle a little wider than long, a little narrowed in front ; anterior median eyes the largest of the eight, not quite a diameter apart, about a diameter from the laterals. *Legs* long (*cf.* measurement), patellæ unspined ; tibiæ armed beneath with 8-10 spines arranged on the anterior legs irregularly in pairs, and long ; protarsi of first and second legs

armed with a pair of long basal spines beneath, a short sub-median pair, and an inferior apical. *Palpi* unspined; patella barely half the length of the tibia, the two together scarcely as long as the femur; tibia sub-cylindrical, a little more than twice as long as high, the apophysis consisting of a pair of short subequal processes with obliquely truncate extremities, directed obliquely outwards and forwards, the upper side of the superior of the two is lightly emarginate and bears a small basal prominence; tarsus long, longer than tibia and patella, constricted at the base, and furnished with a short external, slightly sinuous process, which is stout at the base, pointed at the apex, and directed obliquely outwards and backwards, and resting upon the emarginate upper edge of the superior process of the tibial apophysis; tarsus very wide in the middle, its external border produced into a large flap-like lobe, which anteriorly projects almost at right angles to the subcylindrical terminal portion of the palp.

Measurements in mm.—Total length, 11·0; carapace, 5·0; first leg, 25·0; second leg, 20·0; fourth leg, 25·0 mm.

Sokotra: Hadibu Plain.

Recognisable by the two short subequal external tibial apophysis.

Sparassus, Walck.

23. Sparassus socotranus, sp. n.

♀ *Colour* of integument mostly uniformly pale on body, mouth-parts, and limbs; hairy clothing silky white, intermixed with blackish bristles on the head legs and upper side of abdomen; spines black; upper side of abdomen irregularly spotted with small dark patches, which in the middle line form a long but rather indistinct Y-shaped stripe, the area between the arms of the Y being elongate and fusiform or subelliptical. *Carapace* heart-shaped, about as wide as long, about as long as tibia of first leg, a little shorter than that of second, shorter than patella and tibia of third. *Eyes* of posterior line straight, subequal, and subequally spaced about three diameters apart; eyes of anterior line nearly straight by their centres, the medians larger than the laterals, about a diameter and a half apart and a diameter from the laterals. *Mandible* armed below with four posterior and two anterior teeth; beneath the fang arise four long 'gusatory' bristles. *Mandible* short, convex, not emarginate externally; *labium* very short, about twice as wide as long. *Legs* 2, 1, 4·3 in length (cf. measurements), the tibiae and protarsi with two pairs of inferior spines, no apical spines at extremity of tibiae below. *Ulna* large, impressed with a deep, median, somewhat T-shaped groove, of which the crossbar is lightly recurved, while the stem dips down between the two lobes or sclerites; each lobe consists of two sclerites—one that is uppermost and lies horizontally when the organ is viewed from below, and is pale coloured; the other, being undermost, thickly chitinated dark coloured, placed

vertically, its posterior surface forming a smooth wall at right angles to the pale sclerite.

Measurements in mm.—Total length 11, length of carapace 4.5, of first leg 18, second leg (to end of tibia) 13, third leg 14, fourth leg 17. "

Sokotra: Homhil (1500-2500 ft.).—A single adult female.

This species appears to belong either to the *Olios* or *Midamus* section of the genus *Sparassus*, and in the form of its vulva approaches certain Oriental species, e.g., *Midamus lutescens*, Thorell, from Burma.

Selenops, Latr.

24. Selenops radiatus, Latr.

Selenops radiatus, Latreille, Nouv. Dict. Hist. Nat., xxx. p. 579 (1819.)

Selenops oncosoma, L. Dufour, Ann. Sci. Phys., iv. p. 7, pl. lxix. fig. 4 (1820).

Selenops egyptiaca, Aud. in Savigny, Egypt, Arachn., p. 162, pl. vi. fig. 6 (1829).

Selenops annulipes, Walck., Ins. Apt., i. p. 546 (1837).

Selenops peregrinator, id. loc. cit.

Selenops dufouri, Vinson, Araign., Réunion, etc., p. 79, pl. iii. fig. 1 (1864).

Selenops madagascariensis, id. tom. cit., p. 83, pl. iii. fig. 3.

Selenops ulacer, Blackwall, Ann. Mag. Nat. Hist. (3), xvi. p. 85 (1865).

Selenops sansibarica, Gerstäcker, in Von der Decken's Reisen in Ost Africa, p. 479 (1873).

Selenops latreillei, Simon, Arachn. de France, ii. p. 346 (1875).

Selenops malabariensis, Simon, Act. Soc. L. Bord., xxxiv. p. 234 (1881).

Selenops birmanicus, Thorell, Spiders of Burma, p. 261 (1895).

Selenops diversus, O. P. Cambridge, Proc. Zool. Soc., 1898, p. 390, pl. xxxi. fig. 1.

Most of the above-given synonymy is cited on the authority of Mons. Simon, who has had the opportunity of studying either the actual specimens described by Latreille, Walekenaer, Dufour, Vinson and Andouin, or topotypical examples of their species. Moreover, I have myself examined specimens from various localities ranging from the Cape Verde Islands to the Zambesi and Burma, without discovering any reasons for dissenting from Simon's conclusions. The species also occurs in Madagascar and Réunion. It commonly comes to hand with almost every collection made within the limits of its range, and hence is abundantly represented in all collections with any pretensions to be extensive.

Considering its wide distribution, its occurrence in Sokotra is not a matter for surprise. It was first procured in this island by Mr. Bennett, whose specimen served as the type of *S. diversus* of Mr. Cambridge. A second example was collected by Messrs. Grant and Forbes on the Hadibu Plain. This specimen and the figure of the type of *S. diversus* leave no room for doubt that the latter must be added to the already long list of synonyms of *S. radiatus*, Latreille.

[This large Lycosa-like species was caught among the stones in a dry backwater of the Hanefu River, Hadibu Plain. It was remarkably

active, escaping in a moment every time it was uncovered, and in at last securing it some of the legs were unfortunately injured.—
[H.R.O.G.]

THOMISIDÆ.

Thomisus, Walck.

25. *Thomisus spinifer*, O. P. Cambridge.

Thomisus spinifer, P.Z.S., 1872, p. 308, pl. xiv. fig. 14.

Sokotra: Hadibu Plain.

This species ranges from Somaliland into Egypt and Syria, thence eastwards to Bombay.

Bassaniodes, *gen. nov.*

Ocular-quadrangle wider behind than in front, and about one-fourth wider than long, distance between anterior median eyes greater than between anterior and posterior medians on each side, and a little greater than that between anterior medians and anterior laterals; eyes of anterior line recurved, inferior edge of laterals on a level with centres of medians, the laterals about twice the diameter of the medians; eyes of posterior line strongly recurved, widely separated, the medians a little nearer to each other than to the laterals. *Carapace* evenly convex, not compressed, and not flattened in the region of the fovea.

Femur of first leg with three superior spines; tibia with four pairs of inferior spines, and no lateral spines; protarsus with four pairs of inferior spines and three lateral in front and two lateral behind; second leg armed like the first, but with one spine on the upper side of the femur, the proximal posterior spine on the tibiæ and protarsi sometimes obsolete. Tibia or protarsus of first and second legs shorter than carapace.

Type *B. socotrensis*.

This genus differs from *Bassania*, *Xysticus*, and *Oxyptila* in the spine armature of the anterior legs and the disposition of the eyes.

26. *Bassaniodes socotrensis*, *sp. n.* (Plate xxvi. fig. 2.)

Colour: carapace dark brown with paler spots; sternum and legs chalky greyish-yellow, with dark brown or blackish markings, femora nearly black above, upper side of remaining segments longitudinally banded; abdomen chalky grey, spotted and mottled with brown or black and with indistinct transverse bands on the upper side. *Integument* studded with short stiff setæ; subgranular on the carapace and legs. *Tulva* as in fig. 2. pl. xxvi., the shaded A-shaped portion representing a horny plate of that form overhanging a median narrow bristly cavity bordered on each side by a smooth horny sclerite represented by the unshaded area on each side of the A-shaped piece.

Total length 7.0, carapace 2.5 mm.

Sokotra: Adho Dimellus (3500-4500 ft.).

Dimizonops, *gen. nov.*

Eyes of posterior line subequally spaced, very strongly recurved, the medians very small, 6-7 diameters apart; the laterals large, nearly four times the diameter of the medians. Median quadrangle much wider than long, narrower in front, its anterior width much greater than the length; anterior median eyes about twice the diameter of the posterior medians, about three diameters apart, and slightly farther from each other than from the laterals; laterals enormous, considerably less than their own diameter above the edge of the clypeus, about three times the diameter of the anterior medians, their centres almost on a level with the upper edge of the laterals; clypeus vertical, low, about one-third of the length of the ocular quadrangle, and twice the diameter of the anterior median eyes.

Carapace longer than tibiae or protarsi of anterior legs. Femora of first and second legs with many spines above, tibiae with six pairs of inferior spines and three anterior and three posterior spines; protarsi with five pairs of inferior spines, three anterior, three posterior, and one superior basal spine.

Allied to *Firmicus*, Simon (Hist. Nat. Araign. i. p. 1036), but with the femora and tibiae of the anterior legs not compressed, and apparently differing also by the very great disparity in size between the median and the lateral eyes of each row.

27. Dimizonops insularis, *sp. n.* (Plate xxvi. figs. 1, 1a, 1b.)

Colour: carapace yellowish-red, infusate laterally and on the head; legs yellowish-red, with apex of tibia and protarsus of first and second pairs black; abdomen testaceous, blackish at the sides, ornamented above with dark transverse bands and spots, set off with chalky-white patches as in *Syuema diana*, ventral surface with a pair of ill-defined converging fuscous bands.

Vulva consisting of a transversely oval plate, shallowly impressed in its anterior half, and with its posterior border semicircularly emarginate in the middle.

Total length 7.0, carapace 3.0, first leg 10.5 mm.

Sokotra: Hadibu Plain; Dahamis (350-1000 ft.).

Tibellus, *Simon*.**28. Tibellus**, *sp. (?)*.

A single immature female very like the European species, *T. oblongus*, Walek., in colour.

Sokotra: Dahamis (350-1000 ft.).

Thanatus, *C. Koch*.**29. Thanatus forbesii**, *sp. n.*

♀ *Colour*: integument of carapace yellow, marked with three black bands, one median, wider in the middle, passing from a point behind

the posterior median eyes on to the posterior slope, and one on each side, which, meeting its fellow of the opposite side in the middle of the clypeus, passes backwards, involving the anterior median, anterior lateral, and posterior lateral eyes; mandible with a large black patch on the upper half in front; palpi transversely banded; legs mottled with black, blackish beneath and in front, especially on the femora; upper side of abdomen ornamented with a broad, posteriorly narrowing dark band on each side, lateral surface clouded with black, ventral surface marked with three black stripes; integument sparsely covered with shortish, thick, white plumose hairs, with some yellow hairs of the same kind on the carapace, the superior abdominal bands thickly covered with deep brown hair.

Carapace scarcely or only a little longer than tibia of fourth leg. *Eyes* of posterior line very strongly recurved, the distance between the medians about two-thirds of the distance between the median and lateral on each side, posteriors lying so far back that a straight line joining their anterior edges would lie about three diameters behind the posterior median eye: upper edge of anterior medians higher than lower edge of anterior laterals. Height of clypeus less than length of ocular-quadrangle, which is about as wide as long. Area of *vulva*, with its posterior border emarginate, marked with a pair of pits set tolerably widely apart, with sharply defined edges, angular in front and rounded behind, each pit about as long as wide, the partition between them hairy, and much wider in front than behind; beneath the integument of the smooth area of the vulva are to be seen two conspicuous dark brown piriform patches, broader in front than behind, and converging posteriorly.

Total length 10 mm., carapace 4.

Sokotra: Adho Dimellus (3500-4500 ft.).

A single female specimen.

OPILIONES.

BIANTIDÆ.

Biantes, Simon.

30. *Biantes flaviventris*, sp. n.

Colour: dorsal surface of abdomen brown, becoming paler, almost reddish-yellow on the cephalic area, eyes black, coxæ and anterior abdominal sterna bright reddish-yellow; mandibles flavous, legs flavous at the base, infusate distally. *Dorsal surface* of body, coxæ and sterna of abdomen densely and coarsely granular. *Cephalic plate* unarmed, its anterior border with a low, wide, bluntly-rounded median elevation. The third and fourth abdominal *terga* armed with a pair of sharp up-standing tubercles on each side of the middle line, sometimes a trace of these is visible also on the second, and on the third and fourth there are sometimes additional enlarged tuberculiform granules; fifth,

sixth, and seventh terga with a transverse row of sharp tubercles, eighth with two or more rows of tubercles.

Mandibles robust, unarmed, except for a pair of tubercles above at the base. *Palpi* a little longer than the body, the coxa unarmed externally, trochanter unarmed, femur long and slender, overlapping the femur of the first, but shorter than it; patella piriform, elongate, basally attenuate and bent, unarmed, about half the length of the femur; tibia a little longer than patella, twice as thick, piriform, distally attenuate, normally armed; tarsus of the same form as the tibia but thicker, normally spined. *Legs* with coxae and trochanters granular; coxa of the first with a pair of longer hair-tipped tubercles in front below.

Total length 4.5 mm.

Sokotra: Hombil (1800-2500 ft.); Jena-agahan (1200-2500 ft.).

[These phalangids, like those recorded below from Abd-el-Kuri (p. 204), were found under stones, often in colonies. Their movements are very slow and deliberate, and resemble those of mites rather than spiders.—*W.R.O.G.*]

This species differs from *B. vittatus*, Sim., from Madagascar, and *B. longimanus*, Sim., from S. India (*Bull. Soc. Zool. Fr.*, 1885, p. 25), in the absence of a long conical tubercle on the coxa of the palp and of spine on its patella. From *B. lecithodes*, Thorell (*Ann. Mus. Genova*, xxvii. p. 671), from Burma, and *B. vitellium* (id. op. cit., xxx. p. 727), from Sumatra, by the shortness of the patella of the palp and the absence of the spine.

[ACARIDA.

Occasionally I found on the paths frequented by camels and cattle a large pale blue tick, in size about $\frac{1}{2}$ inch long by $\frac{1}{4}$ inch wide. Our interpreter informed me they greatly infested the camels.—*H.O.F.*]

II.—Scorpions and Spiders of Abd-el-Kuri.

SCORPIONES.

DIPLOCENTRIDÆ.

Heteronebo, Pocock.

Heteronebo, Pocock, Bull. Liverp. Muss., ii. p. 7 (1899).

Genus of the *Diplocentrini*, with the *ocular-tubercle* shallowly sulcate or entire. *Hand* flat above, with strong external keel, or convex above and obsoletely keeled. *Tarsi* not distally lobate, the inferior angle nearly rectangular (about 85°). *Tail* without definite half-moon shaped area at the posterior extremity of the lower surface.

Type of genus, *H. granti*.

Intermediate in character between the Arabian genus *Nebo*, and the Central American and Antillean genus *Diplocentrus*. Resembling the former in the conformation of the fifth caudal segment; the latter, in the structure of its tarsi and ocular-tubercle.

1. *Heteronebo granti*, Pocock.

Heteronebo granti, Pocock, Bull. Liverp. Muss., ii. p. 7 (1899).

♀ *Colour*: dorsal integument of body yellowish-olive brown; legs clearer reddish-yellow, paler distally, tail deep olive brown, nearly black posteriorly; chelæ darker than trunk, deepreddish-brown with blackish crests and fingers.

Carapace very finely and closely granular at the sides, punctured; ocular tubercle not sulcate. *Terga* punctured, very finely granular laterally and in the central depression; the last more granular than the others, with two short granular crests on each side. *Sterna* smooth, punctured, the last obsoletely crested. *Tail* about four times as long as carapace, which about equals its first and second segments taken together in length, the first segment with eight keels, the inferior median obsolete, second keeled like the first with median lateral weaker, third and fourth like the second, but median lateral still weaker, practically obsolete on the fourth, the keels of these segments only crenulate or obsoletely granular, the superior crests high, angled behind, inferior lateral strong on all the segments, the superior and lateral intercarinal spaces lightly concave; fifth segment with strong keels, the three inferior being coarsely granular; vesicle granular below, with small tooth. *Chelæ*: humerus with its upper side coarsely granular in front, without definite crest, bounded behind by a granular crest;

no distinct antero-inferior crest, the anterior surface being merely coarsely granular below ; brachium nearly smooth, its upper side with two crests, the anterior of which is the stronger, furnished with basal angular prominence ; hand flattish above, with strong smooth external finger-keel and weaker median finger-keel, the inner surface weakly granular in front. *Legs* nearly smooth, tarsi without lateral lobes, armed with six pairs of spines. *Pectinal teeth* 8.

Measurements in mm.—Total length 48, carapace 5·5, tail 22.

Abd-el-Kuri, Gebel Saleh (800-1500 ft.).

2. *Heteronebo forbesii*, Pocock.

Heteronebo forbesii, Pocock, Bull. Liverp. Mus. ii., p. 8 (1899).

♀ Very distinct from the foregoing.

Colour more uniformly ochre-yellow, the tips of the mandibles, the fingers of the chelæ, the ocular region of the carapace, and the posterior end of the third, fourth, and fifth caudal segments infuscate. Upper side of *trunk* very finely granular. *Ocular tubercle* distinctly sulcate. Crests on the last abdominal tergite weaker than in *H. granti*, but *sternite* with four crenulate keels. *Tail* with the median lateral crest obsolete even on the first segment ; first and second caudal segments with strong, smooth, inferior keels, these keels obsolete on the third and fourth segments, the remaining crests weaker than in *H. granti*, the superior not angular posteriorly, the lateral intercarinal spaces lightly convex ; vesicle wider as compared with its length than in *H. granti*, with the tubercle distinctly larger. *Chelæ* with hand very different from that of *H. granti*, being evenly convex above from the keel of the hand back to the inner edge, without distinct finger keels. *Pectines* and tarsal spine-armature as in *H. granti*.

Total length 42 mm.

Abd-el-Kuri, Gebel Saleh (800-1500 ft.).

[Both this and the preceding species were found under stones on Gebel Saleh at an elevation of about 1000 ft. Both were apparently rare, as during several days' search only two examples of each species were met with.—*W.R.O.G.*]

These two species may be briefly diagnosed as follows :—

- | | |
|---|-------------------|
| (a) Median keels on last abdominal sternite and first and second caudal segments obsolete ; hand with strong external and weaker median finger keel | <i>granti</i> . |
| (b) Median keels on last abdominal sternite and first and second caudal segments strong ; hand convex above, practically keelless | <i>forbesii</i> . |

ARANEÆ.

ARGIOPIDÆ.

3. *Argyope clarkii*, Blackw.

[Very common on the low bushes near the sea. —*W.R.O.G.*]

See page 188.

4. *Araneus cardioceros*, Pocock.*Araneus cardioceros*, Pocock, Bull. Liverp. Muss., ii. p. 40 (1899).

See page 191.

OPILIONES.

BIANTIDÆ.

5. *Biantes bicolor*, sp. n.

Closely resembling the Sokotran species *B. flaviventris*, p. 200, in structural features, but differing entirely in colour. The whole body above and below, with the coxæ of the legs, jet black; mandibles and palpi entirely flavous; first and second legs yellowish-white, with the tibiae and protarsi black; third and fourth legs entirely yellowish-white, with the trochanters and basal half of femur black.

Total length 3·5 mm.

Literature regarding the Arachnida of Sokotra and Abd-el-Kuri.

Taschenberg, Zeits. Naturwiss. (4), ii. p. 173 (1883), records the following forms as collected by Riebeck:—

(a) **Acarina**.—Some specimens of *Ixodidae* off *Corvus umbrinus*.

(b) **Araneida**.—*Gasteracantha lepida*, O. P. Cambr.

(c) **Scorpionida**.—*Prionurus hottentottus*, Fabr.

R. I. Pocock, Ann. Mag. Nat. Hist. (6), iii. p. 337, pl. xv. fig. 3 (1889).

Buthus socotrensis, sp. n.

R. I. Pocock, op. cit. (6), xvi. p. 98 (1895).

Paracolebis balfouri, sp. n.

(= *Gluxiopsis balfouri*.)

R. I. Pocock, id. op. cit.

Nephila hymenaea, Gerst.

R. I. Pocock, Proc. Zool. Soc., Lond., 1897, p. 758, pl. xli.

Monocentropus balfouri, gen. et. sp. n.

O. P. Cambridge, Proc. Zool. Soc. Lond., 1898, pp. 387-391, pl. xxxi.

Nephila bennetti, sp. n., p. 387 fig. 2.

(= *Nephila hymenaea*, Gerst.).

Selenops diversus, sp. n., p. 390 fig. 1.

(= *Selenops radiatus*, Latr.).

Gasteracantha sadalis, sp. n., p. 388 fig. 3.

(= ? *Gasteracantha lepida*, O. P. Cambr.).

Tetragnatha boydi, sp. n., p. 389 fig. 4.

R. I. Pocock, Bull. Liverp. Muss., ii. (1899).

Scorpiones.—*Heteronebo*, *granti* and *forbesii*, gen. et. spp. nov., pp. 7-8.

Hemiscorpius socotranus, sp. n., p. 8.

Butheolus insularis, sp. n., p. 8.

Araneæ.—*Araneus hoplophallus*, sp. n., p. 40.

Araneus cardioceros, sp. n., p. 40.

Scelidomachus socotranus, p. 41.

Capheris insularis, p. 41.

PLATE XIV.

- Fig. 1.** *MONOCENTROPUS BALFOURI*, Poc. *In an attitude of defence*, p. 183.
- Fig. 2.** *NEPHILA SUMPTUOSA*, Gerst. *Female*, p. 189.
- Fig. 2a.** *The same, Male.*
- Fig. 2b.** *The same, Palpal Bulb of Male.*
- Fig. 3.** *ARGYOPE CLARKII*, Blackw. *Female*, p. 188.
- Fig. 3a.** *The same, Male.*
- Fig. 3b.** *The same, Vulva of Female.*
- Fig. 3c.** *The same, Palpal Bulb of Male.*
- Fig. 4.** *ARANEUS CARDIOCEROS*, Poc. *Showing Vulva of Female*, p. 191.

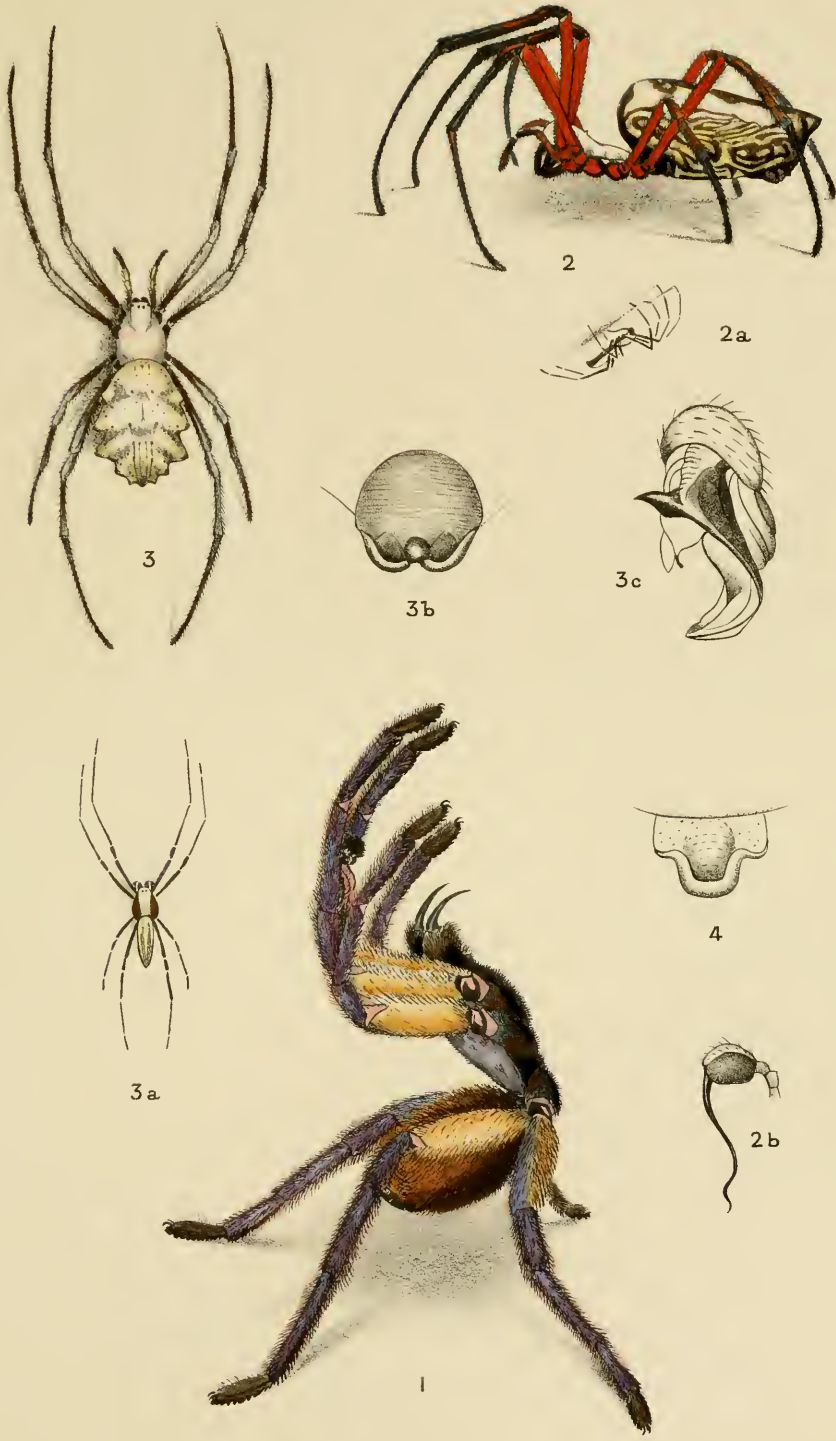
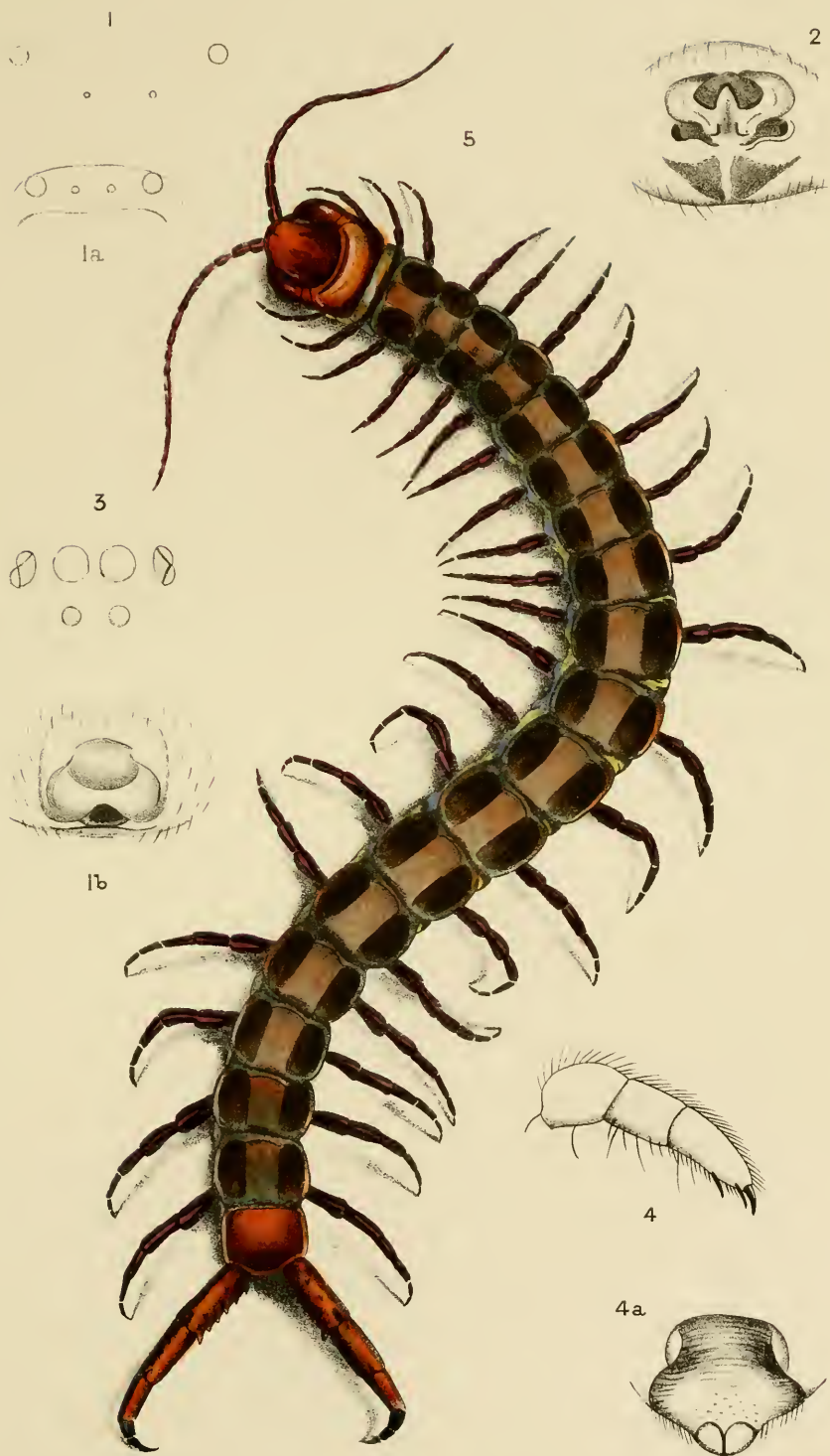


PLATE XXVI.

- Fig. 1.** **DIMIZONOPS INSULARIS**, *Poc.* *Female, Eyes from above,*
p. 199.
- Fig. 1a.** *The same, Eyes from in front.*
- Fig. 1b.** *The same, Vulva of Female.*
- Fig. 2.** **BASSANIODES SOCOTRENSIS**, *Poc.* *Vulva of Female,*
p. 198.
- Fig. 3.** **SCELIDOMACHUS SOCOTRANUS**, *Poc.* *Eyes from in front,*
p. 194.
- Fig. 4.** **CAPHERIS INSULARIS**, *Poc.* *Palpus of Female, profile view,*
p. 195.
- Fig. 4a.** *The same, Vulva.*
- Fig. 5.** **SCOLOPENDRA BALFOURI**, *Poc., p. 431.*



ARTHROPODA.

Crustacea :
Malacostraca.

By R. I. POCKOCK.

{ A. O. WALKER, F.L.S.

{ ANDREW SCOTT.

PLATES XIVA, XIVB.

Crustaceans.

It is hardly necessary to say much by way of introduction to this short chapter on the Malacostraca of Sokotra and Abd-el-Kuri. With exception of the strictly fluvatile species *Potamon socotrensis*, which, so far as is at present known, is confined to the island whose name it bears, and the littoral species, *Uca inversa* and *Ocypode aegyptiaca*, all the forms recorded below enjoy a wide distribution in the Indian and Western Pacific Oceans.* Hence, apart from the fact that, excepting *Cardisoma carnifex*, they have never before been collected actually in the islands now under discussion, their occurrence, which might have been confidently predicted, is a matter of no very special interest.

Taschenberg's summary of the Sokotran fauna contains only two species of Crabs, namely, *Cardisoma carnifex* and *Potamon socotrensis*, the latter being then for the first time described by Hilgendorf. In fairness to Professor Balfour, however, it should be explained that he brought back large numbers of this species before Dr. Riebeck made his visit to the island. Unfortunately, the specimens, together with the rest of his Crustaceans, fell into wrong hands, and were never systematically worked out.

As may be seen from the subjoined list, all the species here recorded from Sokotra form part of Professor Balfour's collection.* Mr. Ogilvie-Grant and Dr. Forbes, wisely confining their attention to the investigation of the land-fauna, only brought home, so far as Crabs are concerned, the strictly fresh-water *Potamon*, which was rightly considered likely to prove of great faunistic importance.

The determination of most of the species was a matter of little difficulty. The *Potamon* and *Uca*, however, about which I was in doubt, I sent to Dr. de Man for examination, and he, with his customary courtesy, kindly furnished me with their names, synonymy, and bibliography

* This observation does not apply to the small collection from rock-pools at Abd-el-Kuri described below by Mr. A. O. Walker and Mr. A. Scott, subsequent to the penning of Mr. Pocock's remarks.—H.O.F.

I.—The Decapods of Sokotra.

DECAPODA.

BRACHYURA.

PORTUNIDÆ.

Scylla, de Haan.

1. *Scylla serrata*, Forsk.

Scylla serrata, A. Milne-Edwards, Arch. Mus. Hist. Nat. Paris, x. p. 349 (1861).

Sokotra.—(*Bulfour*.)

Ranging over the whole of the Indian Ocean from the Red Sea and the East Coast of Africa into the Pacific Ocean.

POTAMIDÆ.

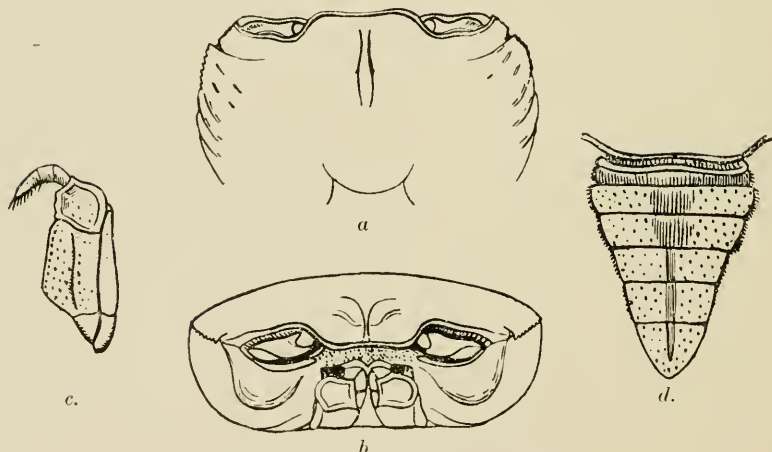
Potamon, Leach.

Telphusa, Auct. plurim.

2. *Potamon socotrensis*, Hilg.

Telphusa socotrensis, Hilgendorf, Zeits. Nat. Wissen., lvi. p. 171 (1883); A. Milne-Edwards, Ann. Sci. Nat. (7), iv. p. 133 (1887); also in Bibl. hautes Etudes, xxxiii. No. 4, p. 13 (1887).

Telphusa granosa, Koelbel, SB. Ak. Wiss., Wien., xc. pt. i., p. 321, pl. i. fig. 6 (1885).



POTAMON SOCOTRENSIS ♀.

a Carapace from above. *b* Carapace from before. *c* External maxillipede.
d Abdomen.

The following is a translation of the description which Mr. A. Milne-Edwards gives of this crab:—

"Carapace flattened, but little widened, the front but little advanced, sloping, with straight edge; eyes large. No postpontal crest. Anterior portion of the shell lightly wrinkled. Antero-lateral border but little arched, and bearing a very small and sharp epibranchial tooth. Interregional grooves scarcely distinct, except in the central portion of the carapace. Chelæ weak, with fingers not separated, and with the surface a little wrinkled. Legs long and compressed."

Length of carapace 21 mm., width 27 mm.

This interesting species has been described at length in the works cited above. It would be superfluous, therefore, to re-describe it in mere detail on the present occasion. At Dr. de Man's suggestion, however, the accompanying figures have been prepared to illustrate the principal systematic features of the species.

Sokotra: Dahamis (500 ft.); Goahal Gorge, near Homhil (900 ft.).

Prof. Balfour and Dr. Riebeck both obtained this species.

[This species was very common in all the streams from sea-level to an elevation of about 1500 feet. At Homhil they inhabited rat-like holes in the banks of the stream. Schuyler traps baited with potato and set for what I at first supposed to be Water-rats, produced several mutilated crabs.—*W.R.O.G.*]

GRAPSIDÆ.

Grapsus, Lamarck.

3. *Grapsus strigosus*, Herbst.

Grapsus strigosus, Ortmann, Zool. Jahrb. Syst., vii. p. 705 (1894) (for synonymy).

Sokotra.—(*Balfour*.)

Widely distributed along the coasts of the Indian and Pacific Oceans.

[This species was not collected by the expedition.]

GEARCINIDÆ.

Cardisoma, Latr.

4. *Cardisoma carnifex*, Herbst.

Cardisoma carnifex, H. Milne-Edwards, Hist. Nat. Crust. ii. p. 23 (1837).

Cardisoma guanhumi, var. *carnifex*, Ortmann, Zool. Jahrb. Syst., vii. p. 735 (1894).

Sokotra.—(*Riebeck*.) Tamarida (= Hadibu).—(*Balfour*.)

Distribution.—Indian and Pacific Oceans.

OCYPODIDÆ.

Uca, Latr.

5. *Uca inversa*, Hoffm.

Gelasimus inversus, Hoffmann, Crust. de Madagascar et de l'île de la Réunion, p. 19, pl. iv. figs. 23-26 (1874); De Man, Notes Leyden Mus., xiii. p. 44, pl. iv. fig. 12 (1891).

Gelasimus chlorophthalmus, Hilgendorf, Mon. Ak. Wiss. Berlin, 1878, p. 803.

Sokotra.—(*Balfour*.)

Previously known, according to De Man, from Nossi-Faly, Natal, Mozambique, Lindi, and Dar-es-Salaam. Up to the present time Sokotra is the most northerly point known in the range of this species.

[Abundant on the shore at Hadibu and Haulaf.—*H.O.F.*]

Ocypode, *Fabr.*

6. *Ocypode ægyptiaca*, *Gerst.*

Ocypode ægyptiaca, Gerstäcker, Arch. Naturg., xxii. p. 134 (1856); Heller, SB., xliii. (1) p. 361 (1861); Hoffmann, Recherches Fauna Madag., etc., Crust., p. 14 (1874); Miers Ann. Mag. Nat. Hist. (5) ii. p. 409 (1878); Id. Op. cit. (5), x. p. 381, pl. xvii. fig. 3, 3a (1882); De Man, Notes Leyden Mus., iii. p. 247 (1881).

Sokotra.—(*Balfour.*)

Common on the shores of the Red Sea, and also recorded from the island of Nossi-Faly, near Madagascar.

MACRURA.

CÆNOBITIDÆ.

Cænobita, *Latr.*

7. *Cænobita rugosa*, *Milne-Edw.*

Cænobita rugosa, H. Milne-Edwards, Hist. Nat. Crust., ii. p. 241 (1837).

Sokotra.—(*Balfour.*)

According to Ortmann this hermit Crab ranges from Japan and Sydney in the Pacific Ocean over the whole of the coast of the Indian Ocean as far as the Red Sea and Natal.

[Common on the beach at Haulaf.—*H.O.F.*]

PALINURIDÆ.

Palinurus, *Gray.*

8. *Palinurus dasypus*, *Latreille.*

Palinurus dasypus, Latreille, H. Milne-Edwards, Hist. Nat. Crust., ii. p. 300 (1837).

Senex dasypus, Ortmann, Zool. Jahrb. Syst., vi. pp. 23 and 32 (1892).

(?) *Palinurus bürgeri*, de Haan, Fauna Japonica, p. 159, pl. xliii. (1859).

(?) *Senex bürgeri*, Ortmann, Zool. Jahrb. Syst., vi. pp. 22 and 32 (1892).

Sokotra.—(*Balfour.*)

The specimen here referred to *P. dasypus*, Latr., as well as one in the British Museum from Muscat, partake of the characters both of *P. dasypus* and *P. bürgeri* as described by Dr. Ortmann, the tergal grooves of the abdomen being uniformly deep and uninterrupted, as in *P. bürgeri*, and the subordinate spines on the antennal segment small, as in *P. dasypus*. In his synopsis of the species of the genus, Ortmann relies upon the completeness of the tergal grooves as the chief feature to distinguish *P. bürgeri*; nevertheless the statement in his descriptive part, that these grooves in *P. dasypus* show a tendency to become obliterated, suggests that their depth and completeness are subject to

variation. *P. bürgeri* appears to be a little-known Japanese form. *P. dasypus*, on the contrary, has been recorded both from Ceylon and Madras, and the British Museum possesses a specimen from the latter locality—a specimen which, in conjunction with the example from Muscat mentioned above, was identified by Mr. Miers as *P. spinosus*, Edw. Although apparently erroneous, this determination by an experienced carcinologist is interesting as demonstrating his opinion that the two specimens are conspecific in spite of the dorsal interruption of some of the tergal grooves in the Madras specimen and the unbroken continuity of all of them in the other. In fact the evidence supplied by these two specimens, which are to all intents and purposes alike in other particulars, seems to show that the interruption of the tergal grooves is, at all events in *P. dasypus*, a feature scarcely of specific value. *P. bürgeri* is unknown to me. Hence I have not ventured to do more than suggest in the above-given synonymy the possibility of its being merely a variety or subspecies of *P. dasypus*.

II.—Decapod and Sessile-eyed Crustaceans from Abd-el-Kuri.

DECAPODA. BRACHYURA

OCYPODIDÆ.

Uca, Latr.

1. *Uca inversa*, Hoffm.

Gelasimus inversus, Hoffman. See p. 213.

Abd-el-Kuri.

[Observed in abundance on the shores.—*H.O.F.*]

Ocypode, Fabr.

2. *Ocypode kuhlii*, De Haan.

Ocypode kuhlii, De Haan, Fauna Japonica, Crust., p. 58 (1859); De Man, Notes Leyden Mus., iii. p. 250 (1881); Miers, Ann. Mag. Nat. Hist. (5), x. p. 384, pl. xvii. figs. 8, 8b (1882).

Abd-el-Kuri.

Distribution.—Ranging, according to Miers, from Japan, Torres Strait, and Java as far as Madagascar.

R. I. POCKOCK.

MACRURA.

[Amid a few handfuls of Seaweeds hastily collected by me from rock-pools, on our second visit to Abd-el-Kuri, a number of minute Crustaceans and Zoophytes were found included. From among the former Mr. Alfred O. Walker and Mr. Andrew Scott were good enough to separate out for identification the forms to which they have devoted special study, and now contribute the remainder of this memoir. The figures are all from the accurate pencil of Mr. Scott.—*H.O.F.*]

The small collection, which forms the subject of the following memoir, was picked out of the residue from a collection of Algae. It was gathered by Dr. Forbes at low water at Abd-el-Kuri, in February, 1899, from rocks and tidal pools, and the Crustaceans were apparently only accidentally present among the weeds. It is instructive, as showing how small is our knowledge of the *Edriophthalma* in tropical seas, that of the 13 species of this sub-class in the collection 6, at least, are new to science, two of them requiring the formation of new genera for their reception. One of these genera (*Kuria*) cannot be referred to any of the recognised families of *Amphipoda*.

The following list shows approximately the geographical distribution of the old species and the nearest allies of the new :—

<i>Hippolyte leptocerus</i> , (Heller)	Mediterranean.
<i>Spharoma grantii</i> , n. sp.	Genus probably cosmopolitan between the 50th parallels of N. and S. latitude.
<i>Edotia</i> , sp.	South Africa, if <i>E. hirtipes</i> .
<i>Hyale nilssonii</i> (Rathke)	Norway, British Seas, Mediterranean, Azores.
<i>Lysianax urodus</i> , n. sp.	Near <i>L. cinghulensis</i> , Stebbing, Ceylon.
<i>Parambasia forbesii</i> , n. gen. and sp.	Near <i>Ambasia integricauda</i> , Stebbing, from Kerguelen Island.
<i>Ampelesca</i> , sp.	Genus cosmopolitan.
<i>Atylopsis lutipalpus</i> , n. sp.	The other published species of this genus are all from the temperate regions of the southern hemisphere.
<i>Elasmopus sokotree</i> , n. sp.	Near <i>E. insignis</i> , Chevreux, Seychelles Islands; <i>E. subcarinata</i> (Haswell), Australia, and <i>E. rapax</i> , Costa, Europe.
<i>Audulla chelifera</i> , Chevreux,*	Seychelles Islands.
<i>Pereionotus testudo</i> (Montagu)	Mediterranean, with a clearly allied species (<i>P. thomsoni</i> , Stebbing) in Australia.
<i>Kuria longimanus</i> , n. gen. and sp.	Nearest ally <i>Birceuna fulvus</i> , Chilton, New Zealand.
<i>Cerapus flindersi</i> , Stebbing,	Torres Straits, Port Jackson.

[CÆNOBITIDÆ.

Cænobita, Latr.

1. Cænobita rugosa, Milne-Ed.

Cænobita rugosa, H. Milne-Ed., Hist. Nat. Crust., ii. p. 241 (1837).

Abd-el-Kuri.

See page 214.

Observed in large numbers near the shore, and also a mile or two from the sea, and at an altitude of a couple of hundred feet.—H.O.F.]

* This memoir was communicated to the Linnean Society on March 20, 1902. On April 28, 1902, Mr. Walker received, by the kindness of Mons. E. Chevreux, his paper from the *Mémoires de la Société Zoologique de France*, Vol. XIV., on the Amphipod Crustaceans collected by Mons. Ch. Alluaud in the Seychelles Islands. Among these, *Audulla chelifera*, n. sp., Chevreux, is certainly identical with a species which had been described in this paper under the name of *Gammaropsis chelata*, n. sp., and we have accordingly substituted Mons. Chevreux's name. Our *Elasmopus sokotree* appears to be almost identical with *E. insignis* n. sp., Chevreux, but there are slight differences which will be indicated below. Finally, *Grubia microphthalma*, n. sp., Chevreux, is probably the same as we have described as *Grubia longicornis* (Kossmann). Mons. Chevreux, however, is quite justified in making a new species of it, the difference between it and Kossmann's description of *Amphithoides longicornis* being, as we had pointed out, considerable.—A. O. W., A. S.

ALPHEIDÆ.**Alpheus, Fabr.****2. Alpheus edwardsii, Audouin.**

Athanasus edwardsii, Audouin, Expl. planch. de Savigny, Descript. de l'Egyp., pl. x. fig. 1 (1809).

One specimen without chelipedes.

HIPPOLYTIDÆ.**Hippolyte, Leach.****3. Hippolyte leptocerus, Heller.**

Virbius leptocerus, Heller, Crust. des südl. Europa, p. 289, pl. x. fig. 5, 6.

Three young specimens.

Rostrum very slender, and bent rather downwards, not reaching beyond the eyes, with one tooth on the upper side and one just beneath the point. In other respects they agree with Heller's description.

Abd-el-Kuri.

EDRIOPHTHALMA.**ISOPODA.****SPHÆROMIDÆ.****Sphæroma, Latr.****4. Sphæroma grantii, n. sp. (Plate xiv A. figs. 1-1c.)**

One specimen.

Body rather oblong, widest in front, with prominent tubercles. Head as wide as, and rather longer than, the first segment without the epimeres; 2 prominent tubercles towards the front, near the median line, and 2 smaller ones between these and the eyes, but rather in front; 4 more along the hind margin, the two middle the largest. Eyes large and prominent in the posterior angle of the head. Antennules more than half as long as the antennæ, with the basal joint not enlarged.

Mesosome: first segment twice as long as the second; epimeres, as seen from above, widening posteriorly; 4 tubercles on the hind margin, the two middle ones the largest. The next 5 segments sub-equal with 6 small tubercles on the elevated hind margin of each. Seventh segment with the hind margin smooth. All the epimeres are much deflexed. Metasome: first segment smooth, partly concealed by the last mesosome segment; second segment with a large, blunt tooth on each side of the median line, and the hind margin at each side produced into a lobe with the apex sinuate. The remaining segments are coalesced with (1st) 3 large tubercles, and (2nd) 2 prominent blunt teeth on each side of a central excavation. The hinder portion is produced much beyond the uropods, with a tricuspidate sculpture on the upper side, near the end. The uropods have the rami sub-equal, rounded-oblong, with smooth margins; a few short setæ on the inner margin of the inner rami.

Length 4 mm.

Abd-el-Kuri.

The single specimen was not dissected, the external characters being in this case of more value than the internal. The palp of the maxillipedes has narrow joints. The species is characterised by its prominent tubercles, &c.

IDOTEIDÆ.

Edotia, Guérin-Ménéville.

5. *Edotia* ? *hirtipes*, Milne-Edw. (Plate xiv A. figs. 2, 2a).

Idotea hirtipes, Milne-Ed., Hist. Nat. Crus., iii. p. 134 (1840).

Two young specimens.

Head as wide as, and rather larger than, the 1st segment; eyes large and prominent. Mesosome: first 4 segments longer and wider than the next 3*; no epimeres are visible in a dorsal view. Metasome: first segment indicated, but not separate, the rest coalesced; the extremity rounded, and the whole fringed with short setæ. Antennæ: the upper reaching beyond the second joint of the lower; the one-jointed flagellum as long as the last two joints of the peduncle: lower antennæ reaching to the 4th segment; the last joint of the peduncle almost as long as the two preceding united; flagellum longer than the peduncle, the first joint as long as the next three together. Uropods, with the terminal portion obliquely pointed, 2 or 3 setules at the tip; the proximal part with 2 plumose setæ at the outer angle and a few setules on the inner margin.

Length 4 mm.

Abd-el-Kuri.

The specimens are too young for certain identification, and may, very possibly, be the above S. African species.

AMPHIPODA.

ORCHESTIIDÆ.

Hyale, Rathke.

6. *Hyale nilssoni*, Rathke, var. (Plate xiv A. figs. 3a-3e.)

Amphithoë nilssoni, Rathke, Beitrage Fauna Norweg. Verhaud. der K. Leop.-Carol. deuts. ak. Naturf., xx., abh. i., p. 2640 (Bresl. 1843).

Several specimens, male, female, and young.

Body moderately compressed. Segments of mesosome increasing slightly in length from the head. Hind margin of third metasome segment rather convex and erenate; the posterior angle subacute, and slightly up-turned. Head almost as long as the first two segments together. Lateral angle slightly produced; subacute. Eyes round-oval; the vertical diameter rather greater than that of the first joint† of the

*This means, in all similar cases, longer than the next three *united*.—A. O. W.

† The first joint of upper or lower antennæ means the first exposed—i.e., the antepenultimate-joint. The first joint of a leg is the basipodite, not the coxopodite.

upper antennæ. Upper antennæ about twice as long as the peduncle of the lower; peduncle about half as long as the eleven-jointed flagellum, the joints of which increase in length distally; lower antennæ in the male more than half the length of the body; peduncle about one-third of the length of the flagellum; the last joint as long as the two preceding. First gnathopods: side plates oblong, widening below, with the angles rounded; first joint as long as the next three; carpus produced behind in a semi-circular lobe fringed with setæ which appear to spring from sockets; propodos as long as the two preceding joints, widest a little below the middle and contracted below the palm, below which is a fringe of setæ. Second gnathopods: in the female, like the first gnathopods. In the male the side plates are quadrate, with rounded angles; the propodos is large, widely ovate, and almost exactly like that of *H. nilssoni* (Rathke). In the female the incubatory lamellæ are rounded at the distal end, and fringed with long hairs. Peraopods as in *H. nilssoni*, except the first joint of the last two pairs, which are rather deeply crenate, especially the lower half. Uropods: the first extend beyond the second, and these beyond the third; rami of the first and second longer, of the third shorter, than the peduncles. Telson normal.

Length of adult 6 mm.

Abd-el-Kuri.

Very near *H. nilssoni*, but differs in the length and proportions of the antennæ; form of the carpus and side plates of the gnathopods, and of the incubatory lamellæ, and in the crenate first joints of the last two pair of pæreopods. We cannot, however, consider it as more than a variety. Specimens of *N. nilssoni* from N. Wales approach these very closely, especially as regards the antennæ.

LYSIANASSIDÆ.

Lysianax, Stebbing.

7. *Lysianax urodus*,* n. sp. (Plate xiv A. figs. 4-4g.)

Body moderately compressed; first segment of mesosome rather larger than the rest, which are subequal; first four side plates considerably deeper than the segments; third segment of metasome with the hinder angle rounded. The head is as long as the first segment; the lateral angles rounded. Eyes large, dark, oval, reniform. Upper antennæ rather longer than the lower in the female; the first joint very thick and nearly twice as long as the next two; flagellum seven-jointed, shorter than the peduncle; the accessory appendage three-jointed and about two-thirds the length of the flagellum; the first joint rather longer than the second, the third very small. Lower antennæ: in the female the last three joints of the peduncle are as long as the five-jointed flagellum, and are subequal in length and

* From οὐρά, tail, ὀδούς, tooth, in allusion to the tooth on the third uropods.

breadth. First gnathopods: the first joint as long as the next three; the front margin of the carpus about two-thirds the length of the propodos, which is not subchelate; dactylus short, strong, and curved; side plate rounded and expanded forward so as partly to cover the head. Pereopods: the last three pair increasing gradually in length posteriorly; first joint much expanded, with a few shallow teeth on the hind margin. Uropods: the first extend beyond the second, and these beyond the third; the peduncle of these last is about as long as the rami, and has a conspicuous tooth at the extremity of the upper margin; the rami are subequal, and densely setose in the ♂. The telson is entire, rounded at the apex, with two setæ on each side and two pair of setules near the middle. It reaches to about the middle of the peduncle of the third uropods.

Length of adult male 5 mm.

Abd-el-Kuri.

This species is nearly allied to *L. cinghalensis* (Stebbing), but differs chiefly in the form of the eyes.

Parambasia, gen. nov.

Side plates very deep. Mandibles as in *Ambasia integricauda*, Stebbing, but with a distinct accessory lobe. Maxillipedes, as in *Ambasia integricauda*, except the dactylus of the palp which is longer. Upper antennæ, with the first joint overhanging the second, as in *Ambasia danielsseni*, Boeck; **first joint of the flagellum like the succeeding joints.** First gnathopod not subchelate, feeble. Second gnathopod with the propodos short, truncate. Pleopods normal. Uropods slender, with the inner rami shorter than the outer. Telson entire.

The species on which this genus is founded resembles *Ambasia integricauda*, Stebbing ('Challenger' *Amphipoda* p. 695, pl. xxvi.), in the mandibles, the first gnathopods and the telson; but differs in the swollen first joint of the upper antennæ, and in having the first pair of pleopods normal. Sars (*Amphipoda of Norway*, p. 46) considers that Stebbing's species is wrongly placed in *Ambasia* which has in the type species, *A. danielsseni*, Boeck, normal pleopods and a divided telson: the first joint of the flagellum of the upper antennæ is also that of a typical Lysianassid and quite unlike our species and Stebbing's. From *Nannonyx*, G. O. Sars, it differs in the comparatively slender and naked first gnathopod and uropods, in the form of the propodos of the second gnathopod and of the upper antennæ, and in the length of the dactyli of the pereopods.

8. *Parambasia forbesii*, n. sp. (Plate, xiv A. figs. 5-5m.)

One female with ova.

Body compressed: first four side-plates more than twice as deep as the segments, the next three nearly as deep as the segments; hind

margin of the third metasome segment slightly concave, posterior angle acute, minutely produced. Head as long as the first segment; lateral angle rounded. Eyes large, dark, oval. Upper antennæ: first joint swollen and overhanging the next, second and third subequal, and like the joints of the flagellum; flagellum, seven-jointed, the first joint like the remainder but *shorter*, all furnished with long setæ on the lower side; accessory appendage three-jointed, reaching the end of the second joint of the flagellum. Lower antennæ slender, the first joint half as long again as the second and twice as long as the third, flagellum six-jointed. Maxillipedes: ends of the inside plates rather obliquely truncate, with a curved spine near the outer angle; fourth joint of palp rather long and irregularly formed. First gnathopod sparsely setose, not subchelate, the first joint as large as the next four; the second joint as long as the third and fourth; third very short; fourth (wrist) half as long as the hand; side-plates large; front margin expanded below, so as to cover most of the head. Second gnathopods: the propodos widening distally and abruptly truncate; the dactylus small and placed low down on the truncate face with a semi-circular row of stiff hooked setæ directed forward above it. Side-plates expanded below. Pereopods: first and second have the third joint but little enlarged, dactylus about half as long as the preceding joint, no spines except one at the end of the fifth joint; the third has the first joint irregularly oval, wider than deep, the third joint enlarged, side-plate about twice as large as the first joint; the fourth and fifth have the first joint very large, in the fifth larger than the fourth and expanded downwards, dactyli about half as long as the preceding joint. Uropods: in all, the peduncles are longer than the rami, and the outer ramus than the inner. Telson semi-oval, with a minute setule on each side of the extremity.

Length 3 mm.

Abd-el-Kuri.

AMPELISCIDÆ.

Ampelisca, Kröyer.

9. *Ampelisca*, sp. (Plate xiv A. figs. 6a, 6b.)

One specimen: length 2 mm.

This example is too young for determination or description. Its principal characters are the rounded rectangular posterior angle of the third segment of metasome and the broad oval dactylus of the last pair of pereopods.

ATYLIDÆ.

Atylopsis, Stebbing.

10. *Atylopsis latipalpus*,* n. sp. (Plate xiv A. figs. 7-7l.)

One female with ova.

* From the unusually wide palp of the first maxillæ.

The sixth segment of the mesosome is the shortest, the seventh the longest; first 4 side-plates about $\frac{2}{3}$ rds of the depth of the segments; posterior margin of third segment of metasome rounded, with a slight indication of the posterior angle; segments of urosome distinct. Head longer than the first segment. Eyes large, oval, dark. Mandibles as in *Paratylus*, small; palps lost. First maxillæ: outer plate crowned with rather long denticulate setæ; inner plate small, with three long plumose setæ on the apex; palp remarkably broad, much wider than the outer plate: the inner angle of the second joint cut off, and the sloping edge with five short teeth; the top of the joint with three setæ. Second maxillæ normal. Maxillipedes with the third joint scarcely produced over the base of the fourth, otherwise normal. Upper antennæ $\frac{2}{3}$ rds as long as the lower; peduncle short, the joints successively decreasing in length and thickness; flagellum ten-jointed, the first joint the longest. Lower antennæ: the first joint very short, the second as long as, but thicker than, the third; flagellum with about 25 joints. First gnathopods: the first joint almost as long as the next four; the second and third short; the wrist as long as the hand, the posterior angle prominent; the hand with parallel margins, the palm oblique, shorter than the posterior margin, slightly convex. Second gnathopods like the first, but rather larger; the first joint longer and stouter; the posterior angle of the wrist produced to about $\frac{1}{3}$ rd the length of the hand. Peraeopods: the first and second have the first joint as long as the next three; the third and fourth as long as the fifth; the last pair have the first joint rather deeper than wide, the hind margin slightly serrate. All the pereopods have strong curved dactyli, and are more or less spinous. Uropods: the first and second with narrow peduncles and rami, the former the longer; inner rami shorter than the outer; peduncles of the third less than half as long as the rami, which are lanceolate and equal, the inner rather the wider; both are spinous on both margins, and furnished with plumose setæ on the inner. Telson divided to about half its length; the extremities of the divisions rounded, and without spines.

Length 4 mm.

Abd-el-Kuri.

But for the divided telson, this genus would seem to belong rather to *Calliopiidae* than *Atylidae*.

GAMMARIDÆ.

Elasmopus, A. Costa.

11. *Elasmopus sokotræ*, n. sp. (Plate xiv B. figs. 1-11.)

Sixteen specimens—males, females with ova and young.

The first two segments of the mesosome are the shortest, the remaining segments increase in length successively; the side plates of the first four are not as deep as the segments; lower margins rounded; the

third segment of the metasome has the posterior angle acute, and slightly turned up; the first segment of the urosome has, in the male, a prominent tooth on each side of the median line. The head is as long as the first two segments. Eyes oval, dark, placed close to the edge of the rounded lateral angle. Upper antennæ nearly twice as long as the lower; end of the peduncle in the male reaching to the end of that of the lower antennæ; in the female exceeding it by the last joint; first joint thick, almost as long as the second; third joint in the male one-third, in the female two-thirds the length of the second; flagellum rather longer than the peduncle; accessory appendage (often wanting in the female) of three subequal joints. Lower antennæ: Last joint of the peduncle rather shorter than the preceding, the two together rather longer than the flagellum. Mandibles very deep, the palp small, shorter than the upper margin, the first joint the shortest, the remaining two of equal length, without setæ, except two at the tip. First gnathopods: the first joint about as long as the next three, propodos oval, as long as the two preceding joints, palm undefined; hind margins of hand and wrist setose; dactylus about one-third the length of the hand. Second gnathopods: in the male the propodos is very large, oval, very sparsely setose, the palm as long as the posterior margin, and defined by a tubercle and the usual spines; a larger spinous tubercle near the base of the dactylus, and a smaller one between these two; dactylus strong; carpus short, and somewhat produced behind in a very setose lobe. In the female the propodos is much smaller, oval, very setose, the palm not defined; carpus about half the length of the propodos. Peraeopods: the first and second moderately strong, the hind margins of the fourth and fifth joints spinous, and a long spine on the side of the latter towards the distal end. Remaining legs extremely robust, spinous, and setose, the third joint as wide as the expanded first, which is finely serrate on the lower part of the hind margin. The dactylus in all five pairs has a secondary tooth, and two or three setæ, and is strong and curved. Uropods: first and second with peduncle longer than the rami, the inner of which in both pairs terminates in a very long spine; both pairs reach to the end of the telson; the third pair are very short, wide, and spinous, the rami equal, rather longer than the peduncle. The telson reaches the end of the peduncle of the third uropods; it is cleft to the base with three unequal spines at the extremity of each division.

Length of male, 7 mm.; female, with ova, 5 mm.

Abd-el-Kuri.

This species shows even more than the usual differences of the genera *Elasmopus*, *Maera*, and their allies between the sexes, viz., in the upper antennæ, the second gnathopods, the presence in the male only of teeth on the urosome, and in the size. It is very near to *E. subcarinata* (Haswell), as described in the 'Challenger' *Amphipoda*, but differs in

having a three-jointed accessory appendage, in the approximate equality of the three joints of the mandibular palp, and a few other minor particulars. As regards the mandibular palp, we prefer Prof. G. O. Sars' definition of the genus, which wisely, in our opinion, makes no mention of this part, as Boeck does. We, therefore, do not feel called upon to create a new genus (as Mr. Stebbing felt constrained to do in *Parclasmopus*), because the third joint is neither "much larger" than the second, nor "curved," etc. We venture to think that the introduction of such trivial characters into the definition of a genus only leads to the unnecessary multiplication of genera. It is hardly necessary to say that Costa, the founder of the genus, says nothing about the mouth organs. As a specific character, the mandibular palp is often very useful—*e.g.*, it would be almost impossible to distinguish the female of this species from that of *E. rapax* (Costa) but for the difference between the small naked appendage of the former, which cannot be seen till the mandible is dissected out, and the powerful setose one of the latter, which projects far beyond the mouth. From *E. insignis* (Chevreux) it differs in the sculpture and comparative nudity of the posterior margin of the propodos of the second gnathopod of the male, and in the absence of the teeth on the first urosome segment in the female.

PHOTIDÆ.

Audulla, Chevreux.

Audulla, Chevreux, Mem. Soc. Zool. de Fr., xiv. p. 388 (1902).

12. *Audulla chelifera*, Chevreux. (Plate xiv B. figs. 2a, 2b.)

Audulla chelifera, Chevreux, loc. supra cit.

Fifteen specimens, male, female, and young.

Body slender: the two first segments the shortest, the last three of the mesosome the longest: posterior angle of the third metasome segment acute and upturned; the first two segments of the urosome are dorsally depressed, with a pair of upright setæ near the hind margin; side plates small and rounded. Head as long as the two first segments: lateral angle acute, the dark, oval eye being situated in it. Mouth organ normal. Upper antennæ: first and third joints subequal in length; the second considerably longer; the accessory appendage is five-jointed; the last joint minute. Lower antennæ like the upper, except the thinner first joint. First gnathopod like that of *Gammaropsis erythrophthalmus* (Lillje); the side plate obtusely rhomboidal. Second gnathopod in the male very large; the first joint rather longer than the next three; carpus short, triangular. Propodos as long as all the preceding joints, oblong, the hinder margin produced to meet the point of the dactylus, so that the limb is truly chelate; the upper and lower margins with rows of long setæ; dactylus very short and strong, like a parrot's upper mandible, with a strong tooth

in the middle of the inner margin. In the female the propodos is much smaller, oval, the palm oblique, more than half the length of the posterior margin; the whole densely setose; the dactylus is serrate on the distal two-thirds of its length. The peræopods resemble those of *G. erythrophthalmus*, except that in the last three pairs the first joint is considerably narrower. The first and second uropods have the peduncle about as long as the rami, with a few spines on both; the outer rami are a little shorter than the inner; the third are the same, but stouter; the tips of the rami densely spinous. The telson is of the usual convex, semi-tubular form, but the extremity is hollowed out, so as to present a deep sinus when flattened out. It has a strong spine, terminated by a setule, and a small setule near it at the extremity of each lobe.

Length of male 5 mm.; the female is rather shorter and stouter.

The males of this species may easily be distinguished by the chelate second gnathopod.

Abd-el-Kuri.

The above species was described by us as *Gammaropsis chelata* before M. Chevreux's paper was received. We still consider that the structure of the third uropods places it in the *Photidae*, rather than the *Ischyroceridae*, to which it is referred by Mous. Chevreux.

AMPHITHOIDÆ.

Grubia, Czerniavski.

13. *Grubia longicornis*, Kossmann. (Plate xiv B. figs. 3a-3e.)

Amphithoides longicornis, Kossman (?) Zool. Reise Roth. Meeres, 2 Häft., 1st Lief., p. 135, pl. ii. (1880.)

One adult male and two young.

The first two segments of body of equal length, the remainder increasing successively; side-plates of the first five segments rather deeper than the segments; the whole body finely but not closely granulate; branchial vesicles large, broadly oval; third segment of the metasome with the lower margin convex, the posterior angle slightly upturned. The head is half as long again as the first segment, the lateral angle rounded. Eye rather small, round, red. Mouth organs as in *Amphithoë* (cf. Sars *Amphipoda of Norway*), but the mandibular palp in a young specimen is relatively smaller, and has only a few setæ at the extreme tip. Upper antennæ considerably longer than the lower, the first joint thicker and rather shorter than the second, which is four times as long as the third; flagellum with 40-50 joints; accessory appendage one-jointed, half as long as the first joint of the flagellum. Lower antennæ: first joint shorter than and about as thick as that of the upper; second and third subequal and rather longer than the second joint of the upper; in the adult male the lower margins of the distal third of the second, the whole of the third and the first few joints of the flagellum are densely fringed with plumose setæ;

flagellum with about thirty joints, the first few ill defined. First gnathopods as in *Amphithoë rubricata* (Mont.), but the side-plates are expanded below towards the head, and have a few setæ at the hind corner. Second gnathopods: anterior margin of the wrist about two-thirds as long as the hand, which is broadly oval; palm oblique, slightly convex and even, shorter than the posterior margin—these two joints in the adult male are densely clothed on the front side with plumose setæ; side-plates oblong-oval, with setæ at the hind corner. Pereopods: the first and second as in *Amphithoë*, the remaining pairs wanting in all three specimens. Uropods: peduncle of the first rather longer, of the second rather shorter than the rami; outer rami the shorter; peduncle of the third more than twice as long as the short, thick rami, of which the outer is the shorter, and furnished with two hooked spines as in *Amphithoë*. Telson half as long as the peduncles of the third uropods, like *Amphithoë*, but rather more rounded.

Length of adult male 11 mm.

Abd-el-Kuri.

In spite of considerable discrepancies with Kossmann's description of *Amphithoides longicornis*, it is probable that our specimens should be referred to that species. His specimens were only 4 mm. in length—the size of one of our young ones. These had lost all their antennæ, but in the adult male the peduncle of the lower antennæ is much longer relatively to the upper than in his species. Again, the accessory appendage in his is two-jointed, and the outer ramus of the third uropods is said to have only one hook, while in ours these figures are reversed, but it is very easy to make mistakes in such points. Della Valle (*Gammarini del Golfo de Napoli*, p. 464) unites this species with *G. crassicornis* (Costa), but the form of the second gnathopod in the male is quite different.

PHLIADIDÆ.

Pereionotus, Bate & Westwood.

14. *Pereionotus testudo*, Montagu. (Plate xiv B. figs. 4a, 4b.)

Ieridium fuscum, Grube, Arch. für Naturgesch. (1864), Vol. i., p. 195, Taf. v.

To this species we refer—at all events, provisionally—a single specimen, which agrees with it in every respect, except in the second uropods having two rami instead of one. This is, no doubt, the form mentioned by Mr. Stebbing (*Trans. Linn. Soc.*, (2), vol. vii., p. 417). Mons. Chevreux has very kindly sent us a similar specimen, and writes as follows:—"I have found the two forms (with one and two rami) in the same localities, among algæ, on the coast of Provence, as well as of Algeria. They have absolutely the same aspect, and only differ in the character of the uropods. It may be a case of sexual dimorphism, but these animals are rare everywhere and I have not sufficient specimens to be sure upon this point."

FAMILIÆ INCERTÆ SEDIS.**Kuria,*** *gen. nov.*

Body laterally compressed. Mandibles with dentate primary and secondary cutting edges; molar tubercle rather large; palp wanting. Maxillipedes with inner and outer plates very small, especially the latter; palp four-jointed. Antennæ subequal; flagella few jointed; no accessory appendage. Gnathopods subequal, very long and slender; propodos in both pairs long and narrow, with a small subchelate palm. Pereopods: last three pair very robust, with the first and third joints greatly developed. Third uropods with one ramus. Telson divided to the base, consisting of two subtriangular plates set on edge.

Abd-el-Kuri.

A very aberrant genus. Its nearest ally seems to be the New Zealand genus *Bircenna* (Chilton), which Mr. Stebbing has placed in the *Phliuidæ* (*Trans. Linn. Soc.*, 2nd ser., vol. vii., p. 421), where, however, it seems somewhat out of place with genera such as *Pereionotus*, *Iphinotus*, etc. It resembles *Kuria* in the characters of the antennæ, gnathopods, mandible, and maxillipedes, and the uniramous third uropods, but differs in having very shallow side plates, and an entire telson.

15. Kuria longimanus, n. sp. (Plate xiv B. figs. 5-5n.)

Two females with ova.

Body rather plump; first and second segments subequal, remaining segments of the mesosome rather longer than these; first four side-plates deeper than the segments, upper posterior angle of the fourth cut away; third metasome segment with the hind margin almost straight, with two narrow notches, posterior angle subacute; urosome with the three segments coalesced. Head small and partly concealed by the first side-plate; no rostrum. Eyes rather small, oval, dark. Upper antennæ rather shorter than the head, and first segment, first and second joints respectively, about twice as thick, but the same length as the following joint; flagellum four-jointed, with a rather long seta, and two or three short ones on the lower margin of each joint. Lower antennæ with seven joints in all, the peduncle apparently of two joints only, of which the first is very small. In both pairs of antennæ it is difficult to distinguish the peduncle from the flagellum. First gnathopods very long and slender, reaching beyond the end of the antennæ; first joint as long as the next three, wrist as wide and almost as long as the hand, which is about five times as long as wide; palm very small, oblique, and defined by a spine; dactylus projecting beyond the palm by about one-fourth of its length; side-plates oblong, the anterior angle rounded, the surface covered

* Derived from Abd-el-Kuri, where the specimens were taken.

with short setules. Second gnathopods like the first. Pereopods: first and second with the first joint narrow and about as long as the next three; third joint a little expanded and produced downwards to a spine; fourth joint about one-fourth as long as the fifth; dactylus strong and curved; the third have the first joint semi-circular, with the hind margin deeply crenate, a forked setule between each of the lobes, a strong spine on the anterior margin near the top, and another in a downward prolongation of that margin; the second joint is small with three spines on the front margin; the third has about eight spines on the front, and the hind margin is greatly produced and dilated, crenate, and furnished with forked setules, as in the first joint; the fifth joint is about as long as the third and fourth, with two or three spines on the front margin; in the last pair the first joint is much wider, and almost circular, the hind margin rather finely serrate with simple setules in the notches; the third joint is much less produced behind, and has four or five setae in front. The side-plates of all and the first joints of the last three pair of pereopods are studded with setules, especially towards the hind margin. Uropods: the first and second have the peduncles rather shorter than the rami, which are equal and similar; in the third the peduncle is short and thick, with a strong spine at the outer extremity. The single ramus is about as long as the peduncle, with a large and small spine at the tip. The telson is divided almost to the base, and the two sub-triangular divisions turned up on edge, the lower margin being convex and the upper straight, with two or three setae near the distal end.

Length 2 mm.

Abd-el-Kuri.

COROPHIIDÆ.

Cerapus, Say.

16. *Cerapus flindersi*, Stebbing. (Plate xiv B. figs. 6-6g.)

Cerapus flindersi, Stebbing, 'Challenger' Report, Vol. xxix., p. 1163, pl. cxxv. (1888).

One female. Length 4 mm.

This agrees in all respects with the female described by Mr. Stebbing ('Challenger' *Amphipoda*), from Flinders Passage, Torres Straits. The male has been described by Dr. C. Chilton in the *Records of the Australian Museum*, vol. ii., 1892, from Port Jackson.

PLATE XIV A.

Fig. 1. SPHÆROMA GRANTII, *n.sp.*, p. 218.

1a, Side view ; **1b**, Head from beneath ; **1c**, Tail from beneath.

Fig. 2. EDOTIA, *sp.*, p. 219.

2a, Operculum.

Fig. 3. HYALE NILSSONI, Rathke, *var.*, p. 219.

3a, Lower antenna ; **3b**, 1st gnathopod, ♂ ; **3c**, 2nd do., ♂ ; **3d**, 2nd do., ♀ ; **3e**,

Fig. 4. LYSIANAX URODUS, *n.sp.*, p. 220.

4a, Upper antenna ; **4b**, Lower do. ; **4c**, 1st gnathopod ; **4d**, 1st pereopod ; **4e**, 3rd do. ; **4f**, 5th do. ; **4g**, Telson and 3rd uropod, ♂.

Fig. 5. PARAMBASIA FORBESII, *n.gen. et sp.*, p. 221.

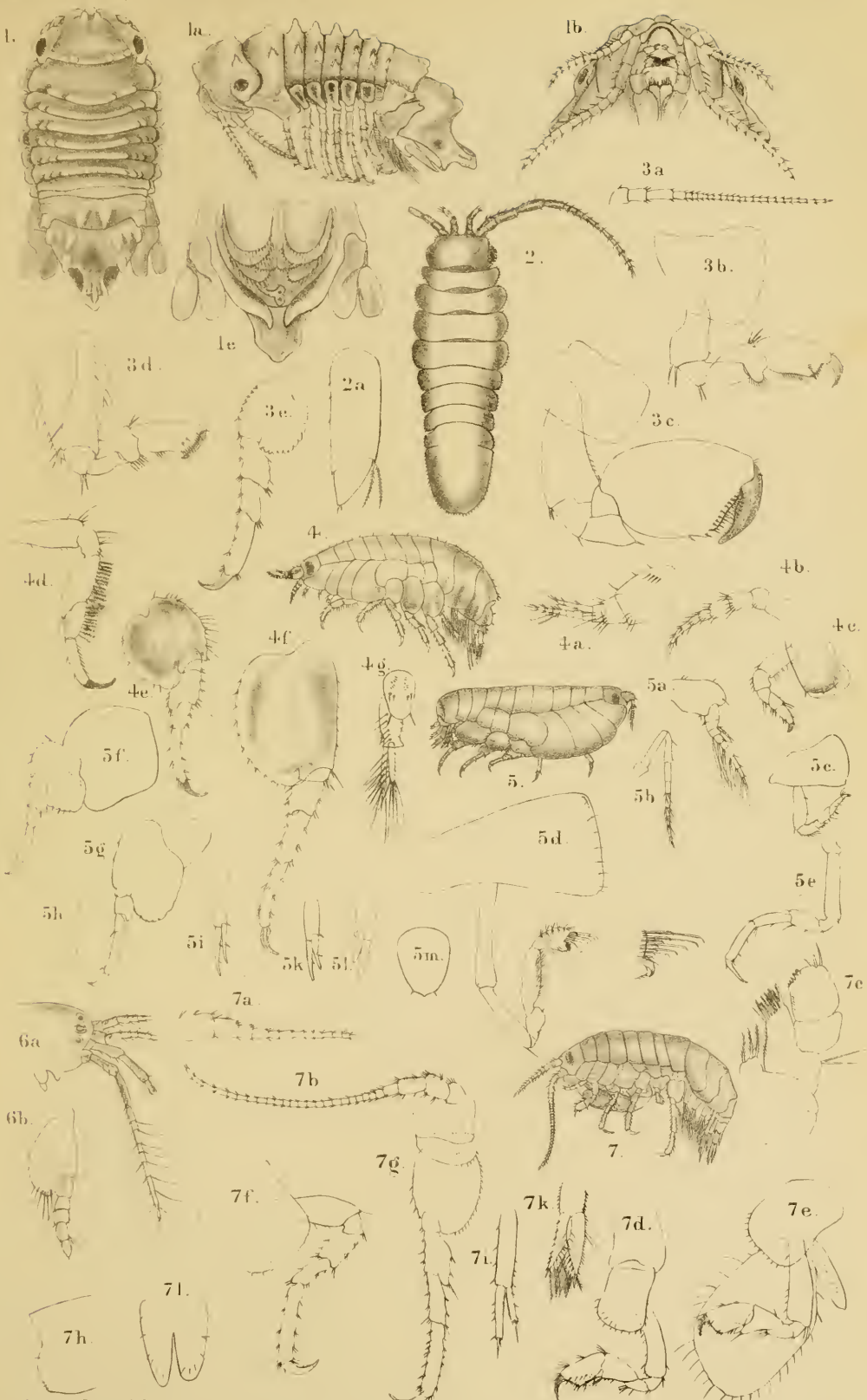
5a, Upper antenna ; **5b**, Lower do. ; **5c**, 1st gnathopod ; **5d**, 2nd do. ; **5e**, 1st pereopod ; **5f**, 3rd do. ; **5g**, 5th do. ; **5h**, 3rd segment of metasome ; **5i**, 1st uropod ; **5k**, 2nd do. ; **5l**, 3rd do. ; **5m**, Telson.

Fig. 6. AMPELISCA, *sp.*, p. 222.

6a, Head ; **6b**, 5th pereopod.

Fig. 7. ATYLOPSIS LATIPALPUS, *n.sp.*, p. 222.

7a, Upper antenna ; **7b**, Lower do. ; **7c**, 1st Maxilla ; **7d**, 1st gnathopod ; **7e**, 2nd do. ; **7f**, 1st pereopod ; **7g**, 5th do. ; **7h**, 3rd segment of metasome ; **7i**, 1st uropod ; **7k**, 3rd do. ; **7l**, Telson (malformed).



A. Scott, ad nat. delt.
R. E. Minter, lith.

Mintern Bros. imp.

PLATE XIV B.

Fig. 1. ELASMOPUS SOKOTRÆ, n.sp., p. 223.

1a, Mandible; **1b**, 1st gnathopod, ♂; **1c**, 2nd do., ♂; **1d**, 2nd do., ♀;
1e, 1st pereopod; **1f**, 3rd do.; **1g**, 5th do.; **1h**, 3rd
 uropod; **1i**, Telson.

Fig. 2. AUDULLA CHELIFERA, Cherreur, p. 225.

2a, 2nd gnathopod, ♂; **2b**, 2nd do., ♀.

Fig. 3. GRUBIA LONGICORNIS, Kossmann, p. 226.

3a, Head; **3b**, 1st gnathopod; **3c**, 2nd do.; **3d**, 3rd uropod; **3e**,
 Telson.

Fig. 4. PEREIONOTUS TESTUDO, Mont., var., p. 227.

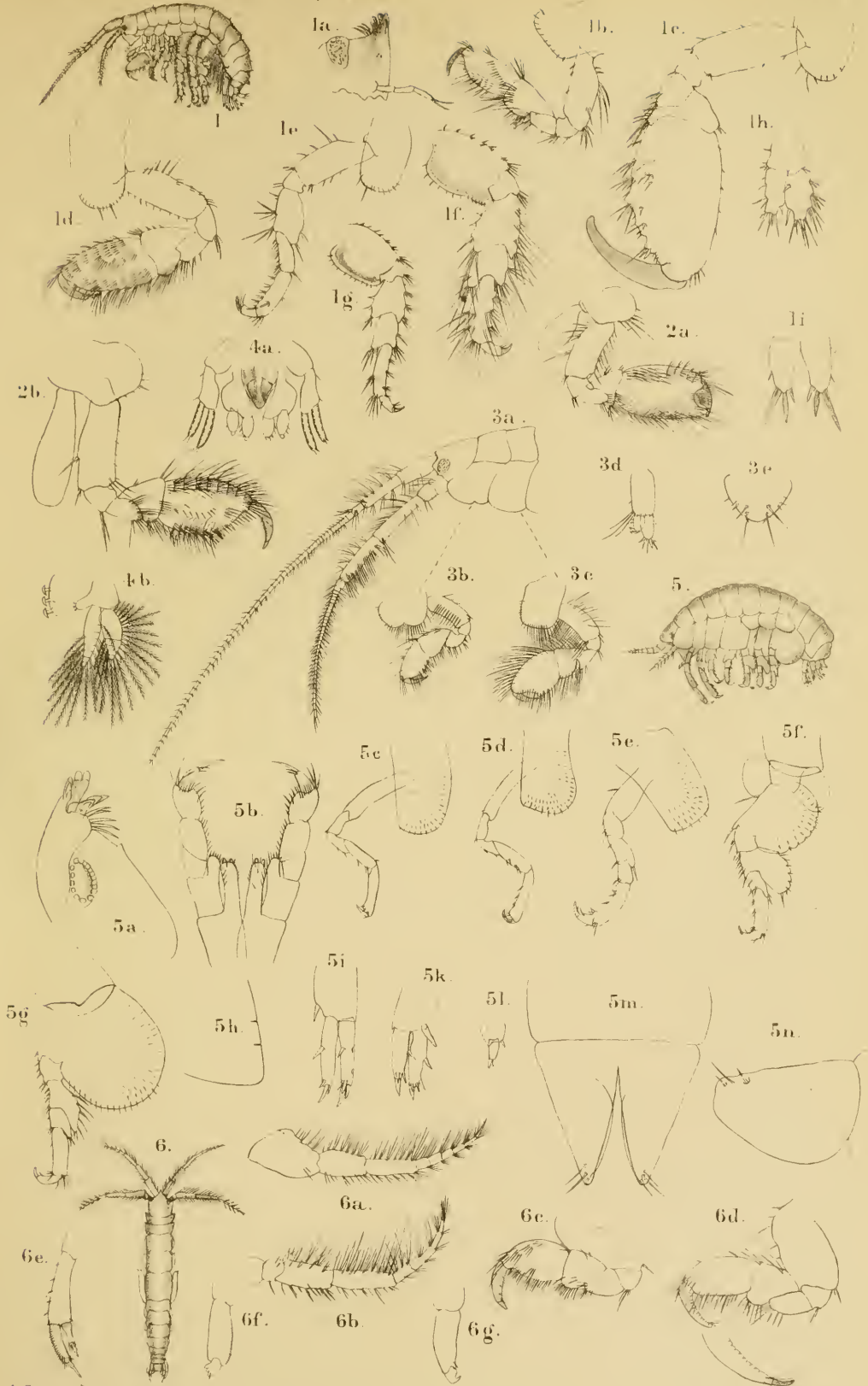
4a, Urosome from beneath; **4b**, 3rd pereopod.

Fig. 5. KURIA LONGIMANUS, n.gen. et sp., p. 228.

5a, Mandible; **5b**, Maxillepedes; **5c**, 1st gnathopod; **5d**, 2nd do.;
5e, 1st pereopod; **5f**, 3rd do.; **5g**, 5th do.; **5h**, 3rd
 segment of metasome; **5i**, 1st uropod; **5k**, 2nd do.; **5l**,
 3rd do.; **5m**, Telson; **5n**, do., side view.

Fig. 6. CERAPUS FLINDERSI, Stebbing, ♀, p. 229.

6a, Upper antenna; **6b**, Lower do.; **6c**, 1st gnathopod; **6d**, 2nd
 do.; **6e—6g**, 1st, 2nd, and 3rd uropods.



A. Scott, ad nat. delt.
R. E. Minter, lith.

CRUSTACEANS FROM ABD-EL-KURI.

Minter Bros. imp.

ARTHROPODA.

Insecta :

Hymenoptera.

By W. F. KIRBY, F.L.S.

PLATES XV., XVI.

Ichneumons, Wasps and Bees.

As is usually the case with small insular faunae, the *Hymenoptera* of Sokotra appear to consist chiefly of endemic species, the few which have been identified as previously known being almost all insects of very wide range. It is, however, quite possible that some of the species, here described as new, may ultimately prove to be identical with forms already described from other localities. Without an approximately complete named collection from all the neighbouring countries to Sokotra, this cannot always be avoided in the case of so large and difficult an order as the *Hymenoptera*. No special observation respecting the fauna occurs to me, except that some of the species exhibit an unusually dark colour, as compared with allied species from other localities.

The Expedition collected 44 species of *Hymenoptera* in all, of which 27 have proved to be new. If we deduct 5 species, all new, from the adjacent island of Abd-el-Kuri, we have a total of 39 species from Sokotra itself, of which 24—two of which were previously described (*P.Z.S.* 1881, p. 649) by myself from the specimens collected by Professor Bayley Balfour, F.R.S.—are believed to be peculiar to the island.

I have also noticed a species of *Harpactopus*, Smith (*Sphegidae*), as occurring in Sokotra (*P.Z.S.* 1898, p. 386). It was captured by Mr. E. B. Bennett. As the probable number of species of *Hymenoptera* existing in Sokotra is hardly likely to be less than from 3000 to 4000, at the lowest possible estimate, it is evident that we must wait for much larger collections before we can attempt to make any useful generalisations respecting the fauna. In the case of known species I have usually referred to Professor Dalla Torre's *Catalogus Hymenopterorum*, instead of attempting to give the synonymy here in full.

I.—The Ichneumons, Wasps and Bees of Sokotra.

TEREBRANTIA.

CHALCIDIDÆ.

LEUCOSPIDINÆ.

Leucospis, Fabricius.

1. *Leucospis insularis*, Kirby. (Plate xv. fig. 1.)

Leucospis insularis, Kirby, Bull. Liverp. Mus., iii. p. 13 (1900).

Length of body 12 mm. ; length of anterior wings 9 mm.

Female. Very thickly and coarsely punctured, clothed with a thin grey pile. Head black, face more finely punctured than the vertex ; antennæ, including scape, and mandibles, except at the tips, red ; joints 8 and 9 blackish above, and 6 and 7 more slightly. Pronotum red, with a transverse yellow line in front, interrupted in the middle ; behind it are two distinct transverse unicolorous carinæ, besides the terminal one. Mesonotum black, with the sides red, and with two red central bands, broadest behind, and not continued forward to the base. Scutellum black, the front angles marked with red, and a yellow transverse sub-terminal line, edged behind with red. Postscutellum yellow in the middle, and red at the sides. Median segment red. Tegulae and a spot below red. Mesopleura black in front, and red behind. Legs red, middle tibiae yellow above, hind femora blackish in the middle, and with a yellow spot at the base outside ; about six moderate-sized black teeth are visible on the outside. Abdomen red, the first and second segments with a sub-terminal transverse yellow line, edged behind with black. Terminal segment not enlarged, ovipositor black, red in the middle, recurved to a little more than the hinder third of the abdomen. Wings smoky hyaline.

Sokotra : Jena-agahan (1200 ft., 12. I. 99) ; one specimen.

A species very dissimilar to any other known to me.

BRACONIDÆ.

Ipchiaulax, Förster.

2. *Ipchiaulax kersteni*, Gerst.

Braccon kersteni, Gerst., Arch. f. Naturg. xxxvii. (1) p. 356, n. 59 (1870) ;
Von der Decken, Reisen in Ost-Afrika iii. (2) p. 361, pl. xiv. f. 12
(1873).

Braccon kersteni, Dalla Torre, Cat. Hymenopt. iv. p. 274 (1898).

Sokotra : Moukaradia, (= Gebel Raggit) (800 ft., 16. XII. 98) ; one specimen.

Described by Gerstaecker from Mombasa.

[In life the body is much inflated, and of an orange red colour.

W.R.O.G.]

ICHNEUMONIDÆ.

Joppa, *Fabricius*.

3. *Joppa*, *sp.*

Sokotra : Hadibu Plain, 15. XII. 96. ; one specimen.

[Came to light at night. —*W.R.O.G.*]

CRYPTIDÆ.

Cryptus, *Fabricius*.

4. *Cryptus pulcherrimus*, *Kirby*. (Plate xvi. fig. 7.)

Cryptus pulcherrimus, Kirby, Bull. Liverp. Mus., iii. p. 14 (1900).

♂ Length of body 18 mm. ; length of anterior wings 13 mm.

♀ Length of body 15.22 mm. ; length with ovipositor 23.32 mm.

Head and thorax mahogany brown, lower parts of face yellowish ; abdomen fulvous, segments after the 3rd mostly blackish ; legs fulvous, hind tibiae yellowish on the inner side in the male, and tipped with blackish in the female ; wings yellowish subhyaline towards the base, and rich iridescent violet towards the margins, a trace of which colour is sometimes visible on the hind coxæ. Head and thorax thickly and regularly punctured ; median segment rugose-punctate ; scutellum, postscutellum, and abdomen nearly smooth, the latter clothed with very short hair. Clypeus very long, oblong, the sides depressed, especially in the middle. Basal segment of the abdomen very long, slightly expanded beyond the middle, where the stigmata are placed ; 2nd segment about $\frac{1}{4}$ shorter than the first, the basal $\frac{1}{4}$ with parallel sides, the rest widening considerably to the extremity in the ♀, but very little in the ♂ ; the remaining joints shorter, closely connected, and with nearly parallel sides in the male, and forming a long oval in the female.

Sokotra : Goahal Gorge (16. I. 99) ; Jena-agahan (1200 ft., 15. I. 99) ;

Adho Dimellus (3500 ft., 8. II. 99) ; Dahamis (350 ft., 24. XII. 98) ;

six specimens.

Not closely allied to any species in the British Museum.

OPHIONIDÆ.

Enicospilus, *Stephens*.

5. *Enicospilus*, *sp.*

Sokotra : Adho Dimellus (3500 ft., 7. II. 99). A single specimen, allied to *E. merdarius*, Grav.

[Came to light.—*W.R.O.G.*]

TUBULIFERA.

CHRYSIDIDÆ.

Stilbum, *Spinola*.6. *Stilbum cyanurum*, *Forst.*

Chrysis cyanura, *Forst.*, *Nov. Spec. Ins.* p. 89 (1770).

Stilbum cyanurum, *Dalla Torre*, *Cat. Hymenopt.* vi. p. 37 (1892).

Sokotra : Hadibu Plain (13-15. XII. 98) ; Addah Valley (17-18. XII. 98) ; Jena-agahan (1200 ft., 14. I. 99) ; nine specimens, all of the deep blue variety.

[Came into tent in bright sunshine.—*W.R.O.G.*]

ACULEATA.

FOSSORES.

SCOLIIDÆ.

Campsomeris, *St. Fargeau*.7. *Campsomeris socotrana*, *Kirby*. (Plate xv. fig. 14.)

Campsomeris socotrana, *Kirby*, *Bull. Liverp. Muss.*, iii. p. 14 (1900).

Length of body 17 mm. ; expanse of wings 29 mm.

Female. Black, face, thorax, and basal half of the segments of the abdomen rather thickly punctured ; the vertex and middle of the pronotum, and of the scutellum and post-scutellum nearly smooth ; face sparingly clothed with fulvous hair, especially round the base of the antennæ ; prothorax, ridges of the pleura, and sides of metanotum clothed with fulvous hair ; abdomen with hair on the base and sides of the first segment, and a band of hair at the extremity of the four following segments, of the same colour. Legs red, clothed with very long tawny hair ; femora black nearly to the extremity, with the cultrate edge beneath the four hind femora bright red. Fore-wings clouded hyaline, yellowish towards the base, and iridescent violet beyond the middle.

Sokotra : Adho Dimellus (3500 ft. 18. II. 99) ; two specimens.

Allied to *Colpa canescens*, *Lep.*, from Senegal, but in that species the legs are black. I see no reason to follow Professor Dalla Torre in referring the latter species to *Tiphia collaris*, *Fabr.*

[Rare ; only met with twice, burrowing in sand ; rather sluggish.—*W.R.O.G.*]

Tiphia, *Fabricius*.8. *Tiphia crassinervis*, *Kirby*. (Plate xv. fig. 10.)

Tiphia crassinervis, *Kirby*, *Bull. Liverp. Muss.*, iii. p. 15 (1900).

Length of body 14 mm. ; length of anterior wing 9 mm.

Female. Black, shining, thickly and closely punctured, abdomen with long, fine, outstanding whitish pubescence ; antennæ, and tibiæ and

tarsi red or reddish, wings smoky hyaline, the nervures black, very thick. Median segment with three longitudinal carinæ, expanding in front, the space between smooth; the apex is vertically truncated. Basal segment of the abdomen rounded in front, scarcely constricted behind.

Sokotra : Adho Dimellus (3500 ft., 4-8. II. 99) ; three specimens ; Homhil, E. Sokotra (1500 ft., 25. I. 99) ; one specimen.

Very distinct from any other species before me, by the incrassation of the nervures.

[Similar in habits to *Campsomeris socotrana*.—*W.R.O.G.*]

POMPILIDÆ.

Salius, *Fabricius*.

9. *Salius extraneus*, *Kirby*. (Plate xv. fig. 8.)

Mygimnia extranea, Kirby (nec *Calicagus extraneus*, Lep.) Proc. Zool. Soc. Lond. 1881, p. 649.

Salius extravaganus, Dalla Torre, Cat. Hymenopt. viii. p. 223 (1897).

The following is my description of the Types :—

“Expanse of wings 1 in. 1 line to 2 in. 6 lines ; length of body 1 in. to 1 in. 5 lines.

Allied to *M. vindex*, Smith, from S. Africa, and *M. prodigiosa*, Gerst., from E. Africa.

Male. Head, antennæ, prothorax, and legs reddish ; a very narrow bright red line round the eyes, and the mouth also shading into bright red ; meso-thorax black above, with three carinæ in front, and a broad raised ridge behind ; scutellum deeply incised ; meta-thorax oval, truncated behind, and clothed with long hair ; pectus and abdomen clothed with a coppery green pile ; the middle of the pectus with a few long grey hairs. Wings deep purple or violet, with blue and green reflections.

Female. Similar, but with the red colouring less marked, especially on the head and pronotum.”

Sokotra : Moukaradia (= Gebel Raggit) (800 ft., 16. XII. 98) ; Homhil (2,500 ft., 19-26. I. 00).

Five specimens were captured by Mr. Grant ; but the figure is taken from one of the types collected by Professor Bayley Balfour. If the genus *Calicagus* (which Colonel Bingham treats as a section of *Pompilus*) is retained, there will be no reason to employ Professor Dalla Torre's name for this species.

[Only on the hills ; commonest on limestone range above Homhil ; makes a great noise flying, and sweeps round in wide circles with legs stretched out behind.—*W.R.O.G.*]

SPHEGIDÆ.**Sceliphron, Linn.****10. Sceliphron ægyptium (Linn.).**

Sphex ægyptius, Linn., Syst. Nat. (Ed. x.) i. p. 569 n. 4 (1758).

Pelopæus ægyptius, Kirby, Proc. Zool. Soc. Lond., 1881, p. 650.

Sceliphron spirifex (Linn.) var. *ægyptiacum*, Dalla Torre, Cat. Hymenopt. viii. p. 391 (1897).

Sokotra : Hadibu Plain (11. XII. 98.) ; Addah Valley, east of Hadibu Plain (17. XII. 98.) ; and Jena-agahan (1200 ft., 17. I. 99.) ; four specimens.

Previously obtained in Sokotra by Professor Bayley Balfour.

[Common ; makes a nest of clay inside hollow trees. One hollow

Boswellia tree near Homhil contained a large colony of nests.—

W.R.O.G.]

11. Sceliphron violaceum (Fabr.).

Sphex violacea, Fabr. Syst. Ent. p. 346 n. 4 (1775).

Sceliphron violaceum, Bingham, Faun. Brit. Ind. Hym. i. p. 240, pl. 1. f. 8 (1897).

Pelopæus bengalensis, Dahlb. Hym. Eur., Sphex, p. 433 n. 2 (1845).

Sceliphron bengalense et violaceum, Dalla Torre, Cat. Hymenopt. viii. pp. 379, 392 (1897).

Sokotra : Hadibu Plain (12. XII. 98.) ; and one from Goahal Gorge, E. Sokotra (1200 ft., 27. I. 99.) ; fifteen specimens, differing a little in size.

The types of *S. violacea* are said to have come from the Cape of Good Hope. The localities given by Colonel Bingham are Southern and Eastern Europe, North Africa, India, Burma, Tenasserim, Ceylon, China, Japan, and the Malayan and Australian sub-regions.

[Met with only on low ground ; frequently seen towards evening on the bushes in clusters of hundreds. It does not attempt to sting when disturbed or caught by the hand.—*W.R.O.G.*]

Sphex, Linn.**12. Sphex erebus, Kirby. (Plate xv. fig. 2.)**

Sphex erebus, Kirby, Bull. Liverp. Mus., iii. p. 15 (1900).

Length of body 20-25 mm. ; length of anterior wings 14-17 mm.

Deep black ; face, from above the antennæ to the extremity of the clypeus, clothed with white hair slightly tinged with yellow ; clypeus long, with parallel sides, or, if anything, slightly narrowed at the lower extremity ; hair on the head above and behind and on the thorax, petiole and coxæ black ; thorax finely and uniformly punctured, scutellum notched in the middle, post-scutellum with two smooth and shining prominences above, with a groove between, median segment transversely striated ; legs black, the middle and hind femora and tibiae more or less red, wings hyaline, black at the base, and dusky at the tips.

Sokotra : Hadibu Plain (11-13. XII. 98) ; five specimens.

Allied to *S. argentatus*, Fabr., but differs in the redder legs, and the black, instead of whitish, hair on the median segment. It would doubtless be considered a mere variety by some Hymenopterists.

According to E. Taschenberg's description of *S. metallica* from Khartoum, the latter has grey hair on the pro- and meso-thorax. O. Taschenberg, however, identifies it with a Sokotran insect, which is doubtless the same as this, and states that it also occurs in Senegal and Zanzibar.

[This insect forms colonies of nests in sandy ground, each nest being occupied by a single individual. Riding or walking through such a colony is at first somewhat disturbing, as the whole of the wasps career wildly round the head of the passer-by. They are, however, apparently harmless. — *H.R.O.G.*]

Harpactopus.

13. Harpactopus, sp.

Harpactopus, sp., Kirby, P.Z.S., 1898, p. 386.

One specimen collected by Mr. Bennett in too worn a condition for determination was mentioned by me (*loc. cit.*) as "allied to *H. crudelis*, Smith, but larger and with reddish mandibles and tibiae."

Pseudapis, Kirby.

Pseudapis, Kirby, Bull. Liverp. Muss., iii., p. 15 (1900).

Head as broad as the thorax. Antennæ with the 2nd joint transverse, 3rd shorter than the following ones, which are about twice as long as broad till towards the extremity. Eyes converging beneath, ocelli on the vertex, the two hinder ocelli about opposite the hinder part of the eyes, and about as wide apart as each is distant from the eye ; central ocellus placed just in front of the others. Pronotum linear ; median segment short, rounded, slightly depressed in the middle in front. Tegulae enormous, extending before and behind the bases of the wings. Legs moderately long and slender and clothed with a fine pile ; four front tibiae spined at the extremity ; hind tibiae ending, in the male, in a huge broad cultrate appendage ; in the female, unarmed. Tarsi long and slender, all the joints spined beneath, except, perhaps, the front tarsi in the female ; first joint of tarsi as long as the succeeding ones together, terminal joint of the middle tarsi ending in a hairy pad, somewhat resembling that in some bees, such as *Podalirius acerrorum*. Wings with one radial and three cubital cells, the radial cell broad, obtuse at the extremity, and not appendiculate ; first radial cell oblong or sub-oval, as long as the third cell in the male, but shorter than in the female ; second cell nearly square, smaller in the male than in the female, third much narrower above than below ; first recurrent nervure received close to the extremity of the second radial cell ; second at about $\frac{1}{4}$ of the extremity of the third cell.

This is a very strange insect, which has the appearance of a Bee, although the long slender cylindrical tarsi seem to exclude it from the family. I am inclined at present to refer it to the *Sphegidae*, in which group it may perhaps form the type of a new sub-family.

14. *Pseudapis anomala*, Kirby. (Plate xv. fig. 7.)

Pseudapis anomala, Kirby, Bull. Liverp. Mus., iii. p. 16 (1900).

Black, face below the antennæ, hinder orbits, pectus, hind borders of scutellum, post-scutellum, and abdominal segments, base of abdomen, and legs in front, covered with white pubescence or pile. Antennæ, tegulæ and legs rufo-testaceous, femora, more or less of tibiæ above, and terminal tuft on middle tarsi, black; antennæ thickly and finely punctured; the body thickly punctured almost everywhere, the front of the abdominal segments less closely than the thorax, because the punctures are much larger; hinder part of the abdominal segments more finely punctured, or smooth.

Sokotra: Moukaradia (= Gebel Raggit) (600 ft., 15. I. 99); two specimens ♂; ♀; Homhil (1500 ft., 26. I. 99).

LARRIDÆ.

***Astata*, Latreille.**

15. *Astata boops*, Schrank.

Sphex boops, Schrank, Enum. Ins. Austr. p. 384 n. 777 (1781).

Astata boops, Dalla Torre, Cat. Hymenopt. viii. p. 652 (1897).

Sokotra: Adho Dimellus (3000 ft., 18. II. 99); one specimen.

A widely distributed species in Europe and the Mediterranean region.

***Tachytes*, Panzer.**

16. *Tachytes trivittatus*, Kirby. (Plate xv. fig. 3.)

Tachytes trivittatus, Kirby, Bull. Liverp. Mus., iii. p. 16 (1900).

♂ Length of body 10 mm.; expanse of anterior wings 8 mm.

♀ Length of body 15 mm.; expanse of anterior wings 11 mm.

Black, sides of fore and hinder orbits clothed with silvery pile, legs black, femora and tibiæ clothed with very fine whitish pile, tarsi reddish, thorax closely and finely punctured, median segment somewhat more coarsely punctured, bordered with whitish pubescence, first three segments of abdomen with terminal band of pale blue pile. Wings purplish hyaline, darkest on the margins.

Sokotra: Homhil (1500 ft., 21. I. 99); and Addah Valley, East of Hadibu Plain (29. I. 99); three specimens.

In the allied species the pale bluish white bands on the abdomen are more numerous.

Notogonia, Costa.**17. Notogonia bicolor, Kirby.** (Plate xv. fig. 9.)*Notogonia bicolor*, Kirby, Bull. Liverp. Muss., iii. p. 16 (1900).

Length of body 8 mm. ; length of anterior wings 6 mm.

Female. Black, tegulae reddish, legs, except the black coxae and trochanters, red ; tarsi a little brownish above. Median segment about as long as the preceding part of the thorax ; dull, thickly punctured, the rest of the body shining. Wings clear hyaline.

Sokotra : Adho Dimellus (3000 ft., 18. II. 99) ; one specimen.

A very distinct species.

Stizus, Latreille.**18. Stizus scutellaris, Kirby.** (Plate xv. fig. 4.)*Stizus scutellaris*, Kirby, Bull. Liverp. Muss., iii. p. 16 (1900).

Length of body 19 mm. ; length of anterior wings 14 mm.

Female. Black, varied with yellow, and slightly with red. Head black above the antennae ; back of head, and tips of mandibles also black. Vertex with the inner orbits red, and with two slightly diverging yellow marks between ; hinder orbits yellow, very widely so beneath, but ending in a detached dot above, at the level of the eyes. Antennae red, scape beneath, and face yellow, the latter clothed with a fine white pile ; labrum somewhat tumid, reddish in the middle, the lower edge concave below. Thorax mostly black, pronotum red in front, and bordered with yellow behind. Mesonotum bordered with red on the sides ; tegulae red ; mesopectus black, clothed with whitish hair, and with two yellow spots, one behind the other, and the first largest, under the base of the fore-wings. Scutellum and post-scutellum, yellow ; behind is a curve, broadest in the middle, on the median segment ; beneath this, on each side, is a moderately short and broad red line. Abdomen with the first segment red above, bordered in front, and more narrowly behind, with black ; a large yellow spot on each side. Segments 2-4 with broad yellow lateral bands, bordered before and behind, and broadly interrupted in the middle, with black ; and bordered on the sides below with red ; the median black space on the second segment is also marked with red on the sides and more broadly behind. Terminal segments mostly red above ; fifth segment with a large oval yellow spot on each side. Ventral surface red, the segments narrowly edged behind with yellow, segments 3-5 black at the base, and segments 2 and 3 with a large yellow spot on each side. Legs reddish ; tibiae and tarsi yellow above. Wings of a slightly yellowish hyaline, the large nervures towards the base and costa reddish, the others black.

Sokotra : Dahamis (19. XII. 98) ; one specimen.

Perhaps a variety or local form of the wide-ranging and variable *S. ruficornis*, Fabr.

[This individual belonged to a nest in the ground. A social species, with the habits of a *Vespa*. The species appears to be very rare on the island, as the only individuals seen were in the immediate neighbourhood of this particular nest.—*W.R.O.G.*]

19. *Stizus adelphus*, Kirby. (Plate xv. fig. 6.)

Stizus adelphus, Kirby, Bull. Liverp. Muss., iii. p. 17 (1900).

Length of body 16 mm. : length of anterior wings 14 (?) mm.

Male. Head black above and behind, the rest yellow. Space between the antennae and eyes yellow, ending in a small square semi-detached spot on each side of the frontal ocellus. Inner orbits narrowly yellow, ceasing at the level of the eyes, but connected with each other by a row of 4 small red spots ; a yellow spot near the base of the back of the head. Face yellow, clothed with a very fine whitish pile, tips of mandibles, and the parts behind black. Pronotum black at the base, red above, and bordered behind by a slender yellow line. Antennae red, four joints before the last two blackish above. Thorax black, with the sides in front of the wings yellow, as well as an adjoining spot on the pleura ; tegulae reddish ; scutellum broadly reddish behind, post-scutellum bordered behind with yellow ; median segment with a short curved yellow streak marked with reddish behind towards the base on each side. Abdomen yellow, first segment red, bordered behind with black, which extends slightly to the base of the second segment ; second segment broadly bordered with black behind ; third segment bordered behind with red, preceded in the middle by black. Legs red, coxae and trochanters black. Wings yellowish hyaline, with reddish nervures, the radial cell clouded.

Sokotra : Hadibu Plain (14. XII. 99) ; one specimen.

Resembles *S. apicalis*, Smith, except that the yellow bands are not interrupted in the middle, as is the case in most of the black and yellow species of *Stizus*. It seems to differ too much from *S. scutellaris* to be the male of that species.

[Captured on Wild Thyme ; no other seen.—*W.R.O.G.*]

***Stizoides*, Guérin.**

20. *Stizoides fenestratus*, Smith.

Larra fenestratus, Smith, Cat. Hym. Ins. iv. p. 342 n. 23 (1856).

Stizus fenestratus, Handlirsch, Sitz. Akad. Wiss. Wien. ci. (1) p. 108 n. 64 (1892).

Sokotra : West of Dahamis (1000 ft., 22. XII. 98) ; one specimen.

The types (males) are from the Congo. Dr. Handlirsch records specimens from Gambia, Zanzibar, and Natal. The wings and abdomen in the single female specimen from Sokotra are somewhat shorter and broader than in the male types. I can detect no other differences, and regard these as probably only sexual.

[No other seen.—*W.R.O.G.*]

RHOPALIDÆ.**Rhopalum, Kirby.****21. *Rhopalum quadricolor*, Kirby.** (Plate xv. fig. 12.)*Rhopalum quadricolor*, Kirby, Bull. Liverp. Muss., iii. p. 17 (1900).

Length of body 12 mm. ; length of anterior wings 8 mm.

Female. Dull black ; head, clypeus and labrum clothed with bright silvery pile ; back of head more sparingly. Scape of antennæ yellow ; mandibles red. Thorax with the collar, a spot below, and two nearly united spots on the scutellum, yellow ; tegulae red ; legs red, middle femora with a short black stripe below, followed by a yellow one ; hind femora with a black stripe below ; hind tibiae with a yellow stripe behind. Four front tibiae with a small yellow dash at the base. Abdomen black, the first segment forming a short, broad petiole at the base, and expanded at the extremity, the rest forming a regular oval ; 1st and 2nd segments with short transverse blood-red lateral stripes near the extremity of the first, and the middle of the second connected below ; 3rd with longer ones near the base ; 4th uniform black, the rest reddish, except the upper part of the 5th. Wings brownish hyaline, narrowly infuscated along the costa of the forewings.

Sokotra : Dahamis (XII. 98) ; one specimen.

The blood-red markings on the abdomen of this species are peculiar.

Towards the base of the median segment is a cluster of 7 mites, which were probably red when alive.

Cerceris, Latreille.**22. *Cerceris lobaba*, Kirby.** (Plate xv. fig. 13.)*Cerceris lobaba*, Kirby, Bull. Liverp. Muss., iii., p. 18 (1900).

Length of body 10 mm. ; length of anterior wings 7 mm.

Female. Head, thorax and abdomen covered with large depressed punctures : head black, antennæ red, blackish above, mandibles red, yellow at the base, and black at the tips ; face clothed with silvery pile ; thorax black, a curved yellow line on the post-scutellum, tegulae and legs red, a black dash on the inner side of the hind femora at the tip ; abdomen red, first segment subquadrate, and only half the width of the second ; incisions, base of 1st segment, and base of 5th blackish ; 2nd segment with a yellow spot on each side before the extremity ; 3rd and 5th with yellow bands, that of the former terminal, expanded on the sides, but interrupted in the middle above ; that of the latter shorter, sub-terminal narrower, but continuous ; pygidium black, lateral carinae yellow. Wings clouded hyaline, forewings infuscated at the tips.

Sokotra : Homhil (1500 ft., 18. I. 99.) ; one specimen.

Allied to the Indian *C. mastogaster*, Smith.

DIPLOPTERA.

VESPIDÆ.

EUMENINÆ.

Eumenes, Latreille.23. *Eumenes dimidiatipennis*, Sauss.

Eumenes dimidiatipennis, Sauss., Etudes Fam. Vesp. i. p. 51 n. 33 (1852);
Dalla Torre, Cat. Hymenopt. ix. p. 22 (1894).

Sokotra: Hadibu Plain (11-13. XII. 98.); five specimens obtained.

A widely-distributed species in Asia and Africa.

[Makes small nests attached to bushes, containing about 20 to 30 individuals.—*H.R.O.G.*]

24. *Eumenes granti*, Kirby. (Plate xv. fig. 5.)

Eumenes granti, Kirby, Bull. Liverp. Muss., iii. p. 18 (1900).

Length of body 20 mm.

Female. Head black behind, and dark brown above, as far as the antennæ, which are red, brownish above towards the extremity. Hinder orbits narrowly yellow; space between the antennæ, sinus in the inner orbits of the eyes, and face below, as far as the extremity of the clypeus, yellow; lower mouth parts reddish. Clypeus longer than broad, slightly concave at the base, and marked with a black dot below each antenna; below the eyes, the sides converge obliquely towards the extremity, which is more deeply concave than the base. Pronotum yellow, narrowly and irregularly edged below with reddish; a red dot in front of the base of the wings. Mesonotum dull black; tegulæ black, bordered below with red; a short yellow stripe at the base of the wings, edged outside by a short black stripe on the base of the wings themselves, but not extending to the costa. Scutellum yellow, bordered with black, post-scutellum and metanotum yellow, the latter broadly black in the middle, and the suture with the post-scutellum narrowly black. Pleura yellow, the sutures very broadly black, slightly bordered with reddish. Legs, including coxæ and trochanters, reddish, tibiæ mostly yellow on the outside. Petiole regularly curved, much broader on its hinder half, with a slight central groove, red, narrowly black at the base, and with a broad black median band, bifid in front, and rather pointed at the extremity, on its hinder half; on each side of this is a large yellow spot, before the extremity of the petiole. Below, there is a black median stripe, followed by a yellow spot before the extremity. Abdomen yellow above, with a longitudinal blackish stripe shading into reddish brown towards the extremity. At the base of the first dorsal segment it is bordered with reddish on both sides, and the middle of the first, the basal half of the second, and the greater part of the fifth dorsal segments are crossed by broad transverse black bands. At the end of the fourth segment the median stripe is interrupted, but it is continued

beyond the dark base of the fifth segment. Ventral segments yellow, the first reddish nearly to the extremity, and the sutures between the second and fourth narrowly black. Fore-wings smoky hyaline, with an iridescence becoming purplish in the radial cell; hind-wings clear hyaline.

Resembles *E. sicheli*, Sauss., from Albania, but the latter is a more slender insect, with no black markings (except narrow sutural lines) beyond the black transverse band on the middle of the first dorsal segment of the abdomen.

Sokotra: Adho Dimellus (3000 ft., 9. II. 99).

A single specimen only obtained. Mr. Grant believes that this species, or one very closely resembling it, occurs in Arabia, but I cannot find that it has been described from that country.

[Apparently very scarce in Sokotra, and difficult to catch; always frequenting steep cliff sides. Only three or four seen.—*H.R.O.G.*]

Rhynchium, *Spinola*.

25. *Rhynchium versicolor*, Kirby. (Plate xv. fig. 11.)

Rhynchium versicolor, Kirby, Bull. Liverp. Muss., iii. p. 19 (1900).

Length of body 14 mm.; length of anterior wings 12 mm.

Female. Head and thorax with large depressed punctures, abdomen with small scattered punctures, clypeus convex, almost pear-shaped, pointed below, where it is deeply channelled in the middle, post-scutellum rounded behind, sides of median segment apparently rounded, abdomen with the basal segment hardly narrower, but scarcely more than half as long as the second. Head black above, as far as the base of the antennæ; above them stands a small transverse yellow mark. Head otherwise red, including the hinder orbits, ocular sinus, and antennæ. Mesonotum and greater part of the scutellum and mesopleura black. Pronotum red, with a yellow spot on each side in front. Mesopleura and mesopectus black, with a grey pile in the middle; a large yellow spot, bordered below with red, below the tegulæ, and below this is another red mark. Tegulæ red, with a curved yellow spot above. Scutellum black at base, and reddish behind, with a transverse yellow stripe before the extremity. Post-scutellum yellow, reddish in front, and the suture behind blackish; sides of median segment yellow above, and red below. Abdomen red, the first and second segments banded behind with yellow; first segment with a broad black central mark, constricted near the base, and not extending to the yellow band; second segment with a broader continuous central black band, widest at each extremity; third and fourth segments transversely blackish at the base. Ventral segments with the terminal depression of the first segment black, second segment with a black mark on the sides, in front of the end of the yellow band; third and

fourth segments blackish at the base and on the sides. Legs entirely red. Wings clouded hyaline, iridescent.

Allied to *B. radiale*, Sauss., from S. Africa.

Sokotra: Homhil, East Sokotra (1500 ft., 21. I. 99); one specimen.

VESPINÆ.

Belenogaster, *Saussure*.

26. *Belenogaster saussurei*, *Kirby*. (Plate xvi. fig. 2.)

Belenogaster saussurei, Kirby, Proc. Zool. Soc. Lond., p. 649 (1881); op. cit., 1898, p. 386.

Belenogaster saussurei, Dalla Torre, Cat. Hymenopt. ix. p. 116 (1894).

Belenogaster tricolor, Taschenberg, Zeitschr. f. Natur. Wiss. lvi. p. 175 (1883).



NEST OF BELENOGASTER SAUSSUREI.

The following is the description I gave (*loc. cit.*) of the Type :—

“Expanse of wings $1\frac{1}{2}$ in. ; length of body 11 lines.

Head, antennæ, prothorax, scutellum, post-scutellum, legs and abdomen of a lively chestnut colour, meso- and metathorax, sides of pectus, and segments 2 and 3 of the abdomen, black. The prothorax is indistinctly and narrowly bordered with yellowish ; and the mouth-parts are more or less yellow in the male. The first segment of the

abdomen is distinctly bordered behind with yellow, most broadly on the upper part of the sides. The thorax, scutellum, &c., are finely punctured, and there are three very shallow longitudinal grooves on the mesothorax, and a more distinct groove in the middle of the metathorax. Wings smoky brown, with iridescent reflections; nervures brown or reddish brown; yellowish towards the base, and along the costa and inner margin of the fore-wings."

Not closely allied to any known species.

Sokotra: Hadibu Plain (12-13. XII.); Dahamis (19. XII. 98); Homhil (1500 ft., 21 & 26. I. 99); Addah Valley, E. of Hadibu Plain, (28. I. 99); eight specimens.

The figure of this wasp is taken from one of the original Types, collected by Professor Bayley Balfour. Specimens were also collected in Sokotra by Dr. E. Riebeck, and Mr. E. B. Bennett.

[The habits are similar to those of *Enmenes dimidiatipennis*. I was fortunate in obtaining three nests of this species, one of which is figured above.—H. R. O. G.]

Icaria, Saussure.

27. Icaria grossepunctata, Kirby. (Plate xvi. fig. 5.)

Icaria grossepunctata, Kirby, Bull. Liverp. Mus., iii. p. 20 (1900).

Length of body 9 mm.; length of anterior wings 5 mm

Female. Upperside evenly covered with large depressed punctures.

Head black, antennæ red, blackish above beyond the middle, scape yellowish beneath in one specimen. Clypeus red, clothed with silvery pile, narrow at the upper angles, broader than long at the lateral angles, and obliquely sloping below to two well-marked teeth. Prothorax wholly red, except a yellow collar in front, mesonotum, mesopleura, front of metapleura, and middle of upper part of median segment black. Tegulae red, with a yellow spot in front. Hinder part of scutellum yellow on the sides, and red in the middle; post-scutellum red. Hinder part of thorax, except as already specified, legs, and abdomen red. Median segment short, slightly sloping and rounded behind; petiole twice as long as broad, blackish at the base and about one-third as broad as the following segment at the extremity. Petiole and following segment with a terminal yellow ring. Wings hyaline, with brown nervures.

Sokotra: Goahal Gorge (16 & 26. I. 99); two specimens.

Not closely allied to any other species before me.

ANTHOPHILA.

ANDRENIDÆ.

Halictus, Latreille.

28. Halictus flavovittatus, Kirby. (Plate xvi. fig. 6.)

Halictus flavovittatus, Kirby, Bull. Liverp. Mus., iii. p. 20 (1900).

Length of body 7 mm.; length of anterior wings 6 mm.

Female. Black, vertex and thorax above thickly and finely punctured, the depressed space at the base of the median segment rather less finely. Face rather long, sparingly clothed with greyish hair, as also the pectus and pleura; hind femora beneath with woolly whitish yellow down; the short hairs of the tarsi inclining to reddish above, and bright fulvous beneath; hind tibiae with tawny hairs on the inside. Abdomen black, shining, with four yellow transverse bands, one at the end of each segment. Terminal segment rufous. Wings iridescent hyaline, clothed with very fine short hairs; stigma testaceous or brown. In the male, the yellow bands of the abdomen are obsolete, and the legs are nearly black, the tarsi only being yellowish beneath.

Sokotra: Adho Dimellus (3500 ft., 3. II. 99); three specimens.

The two females are not precisely alike, but can hardly be regarded as representing distinct species.

[Taken flying round St. John's Wort.—*W.R.O.G.*].

29. *Halictus*, *sp.*

Homhil, E. Sokotra (1500 ft., 25. I. 99); one specimen.

A single damaged specimen of a species with transverse white bands on the abdomen. The punctuation is coarser than in the last species. I do not think it worth while to describe the insect at present.

APIDÆ.

Megachile, *Latreille.*

30. *Megachile argentata*, *Fabr.*

Apis argentata, Fabr., Ent. Syst. ii. p. 336 n. 96 (1793).

Megachile argentata, Dalla Torre, Cat. Hymenopt. x. p. 420 (1896).

Sokotra: Jena-agahan, (1200 ft., 11. I.); Homhil (2500 ft., 22. I. 99); two specimens.

A widely distributed species in Europe, Western Asia, and North Africa.

31. *Megachile punctatissima*, *Kirby.* (Plate xvi. fig. 1.)

Megachile punctatissima, Kirby, Bull. Liverp. Mus., iii. p. 20 (1900).

Length of body 16 mm.; length of anterior wings 12 mm.

Female. Black; head and body very thickly and finely punctured, and even the mandibles covered with large depressed punctures. Head, thorax, and first segment of abdomen clothed with white or greyish-white hair; clypeus and mesonotum denuded. First four segments of the abdomen with long transverse white spots, shortening hindwards, on each side; fifth segment with a mere trace of these. Mandibles, tongue, tegulae and legs more or less rufous; femora blackish, except at tip; pile on undersurface of abdomen yellowish brown. Wings smoky hyaline, costal half of radial cell clouded.

Sokotra: Homhil, E. Sokotra (2500 ft., 22. I. 99); one specimen.

Not closely allied to any species in the British Museum.

32. *Megachile paucipunctulata*, Kirby. (Plate xvi. fig. 3.)

Megachile paucipunctulata, Kirby, Bull. Liverp. Muss., iii. p. 21 (1900).

Length of body 12 mm. ; length of anterior wings 9 mm.

Female. Head and thorax thickly punctured, but more coarsely than in *M. punctatissima* ; hairy clothing similar ; clypeus slightly convex beneath ; labrum set with tawny bristles. Tongue, scape of antennae beneath, tegulae and legs rufous. Abdomen with the first segment concave in front, narrow, black in front, and red behind, sparingly punctured on the sides ; the succeeding segments divided into three sections, most distinctly in the second and third segments ; first basal, black, very thickly punctured ; second black, smooth, and sparingly punctured ; and third red, smooth, sparingly punctured at base. In the following segments this is less obvious, the width of the thick basal punctuation being much reduced ; and the terminal segment is almost wholly black, the punctuation being hidden by short bristles. There are five distinct white bands on each side of the first five segments ; that of the first segment covers the whole width at its base. Undersurface of abdomen dark brown. Wings brownish hyaline, clearer at the base.

Sokotra : Homhil (2500 ft., 22. I. 99) ; one specimen.

Smaller than the last species, which it much resembles ; but the punctuation of the abdomen is so different that there can be no question of any specific relationship, though the single specimens of each were taken at the same time and place.

Crocisa*, Jurine.*33. *Crocisa forbesii*, Kirby.** (Plate xvi. fig. 9.)

Crocisa forbesii, Kirby, Bull. Liverp. Muss., iii. p. 21 (1900).

Length of body 10-11 mm. ; length of anterior wings 9 mm.

Female. Black, with white pubescence on the head, thorax, and upper part of the femora and front tibiae ; on the rest of the legs it is reddish. The mesonotum and scutellum, are, however, almost denuded, and may have been spotted. Antennae reddish brown, scape black. Head sparingly punctured, mesothorax less thickly than the scutellum, the hinder part of which has a tuft of white pubescence, and terminates in a plate, concave on each side, and deeply bifid in the middle. Abdomen, with each of the first four segments apparently divided in two by a deep suture ; the front half is thickly punctured, and the second half smooth. On each side of the hinder smooth half of these segments is a broad ivory-white stripe. The apical segments are strongly punctured, and clothed with tawny hair. Wings iridescent hyaline, clouded at the tips and in the upper part of the radial cell ; marginal and post-costal nervures dark brown, only separated by a slender hyaline streak.

Sokotra: Hadibu Plain (16. XII. 96); and Homhil, E. Sokotra (1500 ft., 18-27. I. 99); three specimens.

Differs from the other species of the genus in having pale bands on only four segments of the abdomen.

34. *Crocisa uniformis*, Kirby. (Plate xvi. fig. 10.)

Crocisa uniformis, Kirby, Bull. Liverp. Muss., iii. p. 21 (1900).

Length of body 10 mm.; length of anterior wings 9 mm.

Deep inky black, antennæ clothed with fine greyish pile, the tegulae reddish in the middle, and the trochanters, femora, and tibiae of the four hind legs more or less ferruginous, at least beneath. Wings purplish hyaline, with some subvitreous spaces just beyond and around the outer cubital cell of the fore-wings; hind-wings paler towards the base. Marginal area of all the wings thickly sprinkled with brown dots. Clypeus obtusely truncated at the extremity; a strong median carina between the antennæ. Head, thorax, and scutellum thickly punctured; abdomen more finely, but still more thickly. Scutellum very broad, only slightly narrowed at the extremity, where it ends in a point on each side, between which is a concavity which is rather obtusely angulated than rounded. Between the sides of this angle projects a tuft of rather strong greyish bristles.

Sokotra: Moukaradia (= Gebel-Raggit) (800 ft., 16. XII. 98); Dinehan Valley (3000 ft., 11. I.); Adho Dimellus (3000-3500 ft., 3-5-7. II. 99); seven specimens.

A very remarkable species, abundantly distinct from any other.

[Apparently a solitary, ground-frequenting species. Rather sluggish in habits, but stings severely.—*W.R.O.G.*].

***Podalirius*, Latreille.**

35. *Podalirius quadrifasciatus*, De Villers.

Apis quadrifasciata, De Villers, Linn. Ent. iii. p. 319 n. 90 (1789).

Podalirius quadrifasciatus, Dalla Torre, Cat. Hymenopt. x. p. 284 (1896).

Anthophora quadrifasciata, Bingh. Faun. Brit. Ind. Hym. i. p. 529 n. 930 (1897).

Sokotra: Moukaradia (= Gebel Raggit) (600 ft., 15. XII. 98); Homhil (2500 ft., 19 & 26. I.); Homhil (1500 ft., 21. I.); Dinehan Valley (3000 ft., 1. II.); Adho Dimellus (3500 ft., 5 & 15. II.; 4000 ft., 16. II. 99); nine specimens.

A wide-ranging species found throughout the greater part of Europe, Asia, and Africa. These Sokotra specimens are finer than any previously in the Natural History Museum Collection, except a pair from the Canaries.

[By no means common in Sokotra, but most numerous in the limestone district round Homhil, where several were taken in a marsh below our camp.—*W.R.O.G.*]

36. *Podalirius fulvitectus*, Kirby. (Plate xvi. fig. 14.)*Podalirius fulvitectus*, Kirby, Bull. Liverp. Muss., iii. p. 22 (1900).

Length of body 11-12 mm. ; length of anterior wings 7-9 mm.

Almost the whole insect thickly clothed with fulvous pubescence, the base of the segments of the abdomen and the terminal segment very thinly. A broad triangular spot above the clypeus, the clypeus, and all the lower mouth-parts pale yellow, clypeus with a broad trapezoidal black spot on each side, not extending to the extremity, which is cut off straight, and is broader than above ; base of labrum with a black dot at each angle, sometimes connected by a black line. Wings almost hyaline, with brown nervures. Antennæ rufous.

Sokotra : Moukaradia (= Gebel Raggit) (22. XII. 98) ; West of Dahamis (500 ft., 22. XII. 98) ; Jena-agahan (1200 ft., 9. I. 99) ; Homhil (2500 ft., 22. I. 99) ; Adho Dimellus (3500-4000 ft., 16-17. II. 99) ; seven specimens.

Allied to the S. European *P. garrulus*, Rossi ; but in that species the antennæ and the base of the segments of the abdomen are black.

37. *Podalirius antennatus*, Kirby. (Plate xvi. fig. 11.)*Podalirius antennatus*, Kirby, Bull. Liverp. Muss., iii., p. 22 (1900).

Length of body 11 mm. ; length of anterior wings 7 mm.

Female. Black. Head clothed with greyish white hair, inclining to tawny on the vertex, clypeus black above, and broadly yellow below, with a small triangular projection upwards ; labrum yellow ; clypeus and labrum narrowly edged below with rufous ; mandibles black. Thorax above with light tawny, and below with grey hair ; legs clothed with grey hair, mixed with tawny ; hind legs almost entirely tawny ; tarsi rufous. Antennæ red, black towards the base, and along the outer side. Abdomen thickly punctured ; first segment clothed with grey hair at the base, and terminating in a very narrow orange, yellow, and white line, the white colour widened behind on the sides over the base of the second segment, which terminates in a narrow orange line. Third segment with a broad white band at the base, and a narrow terminal orange line. Fourth segment with white bands at the base and extremity, beneath which may be seen the terminal orange line. Fifth segment entirely tawny ; sixth black in the middle, and tawny on the sides. Wings hyaline, with brown nervures.

Sokotra : Homhil (2500 ft., 22. I. 99) ; one specimen.

A very peculiar species ; it is to be regretted that a series was not obtained.

Xylocopa*, Latreille.*38. *Xylocopa æstuans*, Linn.***Apis æstuans*, Linn., Syst. Nat. (Ed. x.) i. p. 577 n. 37 (1758).*Xylocopa æstuans*, Kirby, Proc. Zool. Soc. Lond., 1881, p. 649 ; Dalla Torre, Cat. Hymenopt. i. p. 540 (1897).

Sokotra : Hadibu Plain (12-17. XII. 98) ; Goahal Gorge (500 ft., 27. I.) ;

Adho Dimellus (3500 ft, 7. II. ; 3000 ft., 9. II. 99); twelve males and six females.

This species was previously brought from Sokotra by Professor Bayley Balfour. It is widely distributed in North Africa, Western Asia, and the Indo-Malayan region generally.

Apis, Linn.

39. Apis fasciata, Latr.

Apis fasciata, Latr. (nec Linn., nec Fabr.) Ann. Mus. Hist. Nat. v. p. 171 n. 5, pl. 13. f. 9 (1804).

Apis mellifica, var. *ligustica*, Spin., Ins. Ligur. i. p. 35 n. 15, pl. 1. f. 13 (1806).

Apis mellifera, varr. *fasciata et ligustica*, Dalla Torre, Cat. Hymenopt. x. pp. 608, 609 (1896).

Sokotra: Hadibu Plain (12-13-16. XII. 98); Adho Dimellus (3500 ft., 10. II. 99); five specimens.

This is evidently the common Hive-bee of Sokotra.

I cannot distinguish between specimens labelled *A. fasciata* and *A. ligustica* in the Museum; and both insects are regarded by Smith and Dalla Torre as mere varieties of *A. mellifera*, Linn. *A. fasciata* and *ligustica* may be the same, but I doubt their identity with *mellifera*.

[Met with occasionally in enormous colonies. One particular colony on the lower slopes of Gebel Raggit was formed in a hollow in the rock, and must have contained a vast number of individuals, for they streamed in and out of the fissure in endless columns. These colonies are said to be owned by the natives.—*W.R.O.G.*]

[FORMICIDÆ.

Lieut. Wellsted noted in 1834 that "Ants are very numerous," and when camping on the edge of the Nugget Plain he found the ground so "infested with Sand-Flies and Red Ants that it was almost impossible to sleep. The bite of one kind," he adds, "is scarcely less painful than the sting of a Wasp."—*H.O.F.*]

II.—The Wasps and Bees of Abd-el-Kuri.

ACULEATA.

FOSSORES.

BEMBICIDÆ.

Bembex, *Fabricius*.

1. *Bembex dissimilis*, *Kirby*. (Plate xvi. fig. 4.)

Bembex dissimilis, Kirby, Bull. Liverp. Mus., iii. p. 22 (1900).

Length of body 14-16 mm.; length of anterior wings 10-11 mm.

Female. Head, thorax and abdomen black above. Head clothed with whitish pubescence above, hinder orbits narrowly yellow, clypeus yellow on the lower border, and more narrowly on the sides, proboscis pale yellow on the basal half, and with the apical half reddish. Antennæ with the scape yellow beneath, and black above, except at the extremity; flagellum blackish above, more or less reddish at the joints, and reddish beneath, except for a short longitudinal line at the base. Pronotum thickly and finely punctured, black, clothed with greenish grey hair, which is longer and whiter on the hinder borders. Abdomen more coarsely punctured than the thorax, the pubescence scanty, except at the base. Legs yellow or reddish, the femora above and below, the tibiæ and the first two joints of the hind tibiæ lined above with black. Front tarsi with a row of very long pale yellow bristles, tipped with black. Wings clear hyaline.

Abd-el-Kuri (22. II. 99): six specimens.

A very remarkable species, on account of the total absence of yellow markings on the abdomen; in one specimen only is there a small transverse pale yellow mark on each side of the second segment of the abdomen.

[A solitary ground-frequenting species.—*W.R.O.G.*]

SPHEGIDÆ.

Sphex, *Linn*.

2. *Sphex granti*, *Kirby*. (Plate xvi. fig. 12.)

Sphex granti, Kirby, Bull. Liverp. Mus., iii. p. 23 (1900).

♂. Length of body 15 mm.; length of anterior wings 11 mm.

♀. Length of body 22-25 mm.; length of anterior wings 14 mm.

Head, thorax, and petiole black, clothed with long white pubescence, which is silvery white on the clypeus and hinder orbits; abdomen

fulvous, the basal segments and incisions exhibiting a fugitive silvery pile; segments 3 to 5 with more or less extended transverse black spots over the sutures. Head broader than the thorax, clypeus much widened below the eyes, anterior margin transverse, hardly notched in the middle, thorax punctured, scutellum and post-scutellum with a smooth transverse elevation in the middle, median segment closely and regularly longitudinally striated from side to side, and with a strong conical tooth on each side a little before the middle; abdomen smooth and shining, terminal segments of female rather long. Wings hyaline, slightly darker towards the tips; nervures piceous.

Abd-el-Kuri (22. II. 99.); ten specimens.

This species has a superficial resemblance to the European *S. flavipennis*, Fabr., but the petiole is longer. It is perhaps nearest allied to *S. lineola*, Lep., from Java, but in the latter species the wings are dusky, and the dark markings of the abdomen are more extensive. *S. granti* is abundantly distinct from this or any other species at present in the Museum.

[A solitary ground species, generally seen burrowing, or running about quickly among the sand and stones.—*H.R.O.G.*]

DIPLOPTERA.

VESPIDÆ.

VESPINÆ.

Icaria, *Saussure*.

3. *Icaria aterrima*, *Kirby*. (Plate xvi. fig. 8.)

Icaria aterrima, Kirby, Bull. Liverp. Mus., iii. p. 23 (1900).

Length of body 7 mm.; length of anterior wings 5 mm.

Female. Deep black, without a trace of any other colouring; head and thorax thickly and closely punctured, the mesonotum more finely than the rest; abdomen more sparingly, especially behind, clypeus longer than broad, strongly bifid at the extremity, median segment furrowed down the middle, and terminating in two small teeth, petiole rounded in front, raised part not longer than broad. Wings deep purple.

Abd-el-Kuri (22. II. 99.); two specimens.

Its small size and perfectly black colour will easily distinguish it from every other known species.

ANTHOPHILA.

ANDRENIDÆ.

Colletes, *Latreille*.

4. *Colletes inconspicua*, *Kirby*. (Plate xvi. fig. 15.)

Colletes inconspicua, Kirby, Bull. Liverp. Mus., iii. p. 23 (1900).

Length of body 8 mm.; length of anterior wings 5 mm.

Female. Black, thickly clothed with yellowish grey hair, except on the upper surface of the four front femora, a line down the tibiae, and three broad and one narrow band on the abdomen. Hair on the underside of the tibiae and tarsi golden or rufous; tongue, terminal joint of antennae, and terminal joint of the tarsi red. Eyes long, inner orbits slightly convex above, and hardly converging below, clypeus truncated at the extremity; pronotum sparingly, abdomen very finely and thickly, punctured. Tegulae testaceous, wings hyaline, with brown nervures and reddish stigma.

Abd-el-Kuri (22. II. 99); two specimens.

Most resembles an unnamed species from S. Africa in the British Museum.

[Found flying about bushes.—*W.R.O.G.*].

APIDÆ.

Podalirius, Latreille.

5. *Podalirius pyramidalis*, Kirby. (Plate xvi. fig. 13.)

Podalirius pyramidalis, Kirby, Bull. Liverp. Muss., iii. p. 24 (1900).

Length of body 9-10 mm.; length of anterior wings 8-9 mm.

Black, vertex, thorax above, and the front legs and upper and outer side of the four hind femora and tibiae clothed with fulvous hair. Inner and hinder orbits and sides of clypeus clothed with white hair. Clypeus arched above and cut off straight below; black above, yellow at the extremity, with a pyramidal spot rising from it to two thirds of its height. Labrum and lower mouth-parts yellow, labrum with a black dot at the base on each side, sometimes connected by a black line. Antennae dark reddish brown, almost black. Pleura clothed with greyish hair. Abdomen black, very finely punctured, with four snow-white bands at the extremities of the segments; terminal segment with greyish white hair on each side at the base. Wings hyaline, with brown nervures.

Abd-el-Kuri (22. II. 99); four specimens.

Allied to the widely-distributed *P. quadrifasciatus*, Villers, but smaller and with the face differently marked.

PLATE XV.

- Fig. 1. LEUCOSPIS INSULARIS, p. 236.
- Fig. 2. SPHEX EREBUS, p. 240.
- Fig. 3. TACHYTES TRIVITTATUS, p. 242.
- Fig. 4. STIZUS SCUTELLARIS, p. 243.
- Fig. 5. EUMENES GRANTI, p. 246.
- Fig. 6. STIZUS ADELPHUS, p. 244.
- Fig. 7. PSEUDAPIS ANOMALA, p. 242.
- Fig. 8. SALIUS EXTRANEUS, p. 239.
- Fig. 9. NOTOGONIA BICOLOR, p. 243.
- Fig. 10. TIPHIA CRASSINERVIS, p. 247.
- Fig. 11. RHYNCHIUM VERSICOLOR, p. 238.
- Fig. 12. RHOPALUM QUADRICOLOR, p. 245.
- Fig. 13. CERCERIS LOBABA, p. 245.
- Fig. 14. CAMPSOMERIS SOCOTRANA, p. 238.

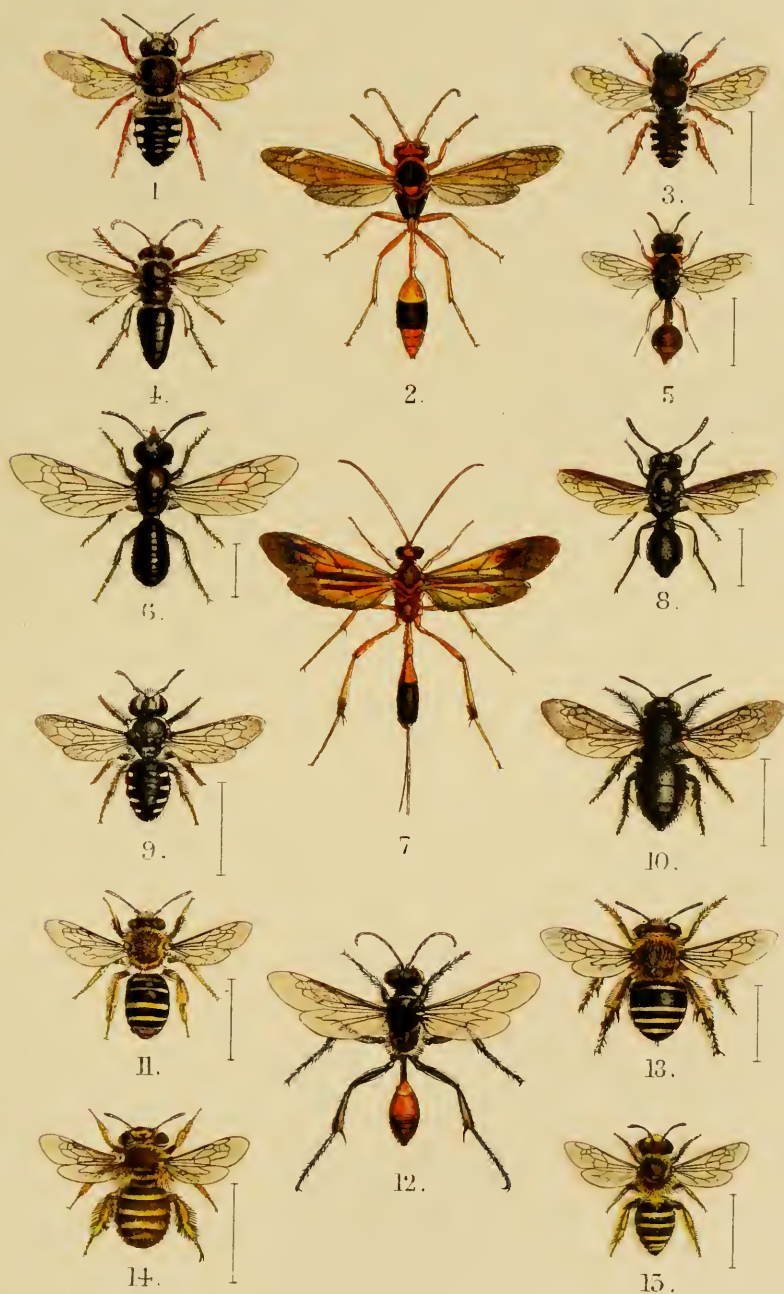


Horace Knight del. et lith

West, Newman chromo.

PLATE XVI.

- Fig. 1. MEGACHILE PUNCTATISSIMA, p. 250.
Fig. 2. BELENOGASTER SAUSSUREI, p. 248.
Fig. 3. MEGACHILE PAUCIPUNCTULATA, p. 251.
Fig. 4. BEMBEX DISSIMILIS, p. 255.
Fig. 5. ICARIA GROSSEPUNCTATA, p. 249.
Fig. 6. HALICTUS FLAVOVITTATUS, p. 249.
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Fig. 9. CROCISA FORBESII, p. 251.
Fig. 10. CROCISA UNIFORMIS, p. 252.
Fig. 11. PODALIRIUS ANTENNATUS, p. 253.
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Fig. 13. PODALIRIUS PYRAMIDALIS, p. 257.
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Fig. 15. COLLETES INCONSPICUA, p. 256.



ARTHROPODA.

Insecta:
Coleoptera.

By C. J. GAHAN, M.A.

PLATE XVII.

Beetles.

In the *Proceedings of the Zoological Society of London* (for 1881 pp. 469-478), Mr. C. O. Waterhouse gave an account of the *Coleoptera* collected in Sokotra in the previous year by Professor Bayley Balfour. Twenty-four species were enumerated, of which twelve were described as being new. Two years later, Dr. Taschenberg published his *Beiträge zur Fauna der Insel Sokotra* in the *Zeitschrift für Naturwissenschaften* (Band lvi., 1883), wherein, from the materials collected by Dr. Riebeck, he was enabled to add nine species, including six new, to the list of the *Coleoptera* previously recorded by Waterhouse, thus bringing the total number of species known from the Island up to thirty-three. With the exception of one or two isolated descriptions of species, these two are, so far as I know, the only papers dealing with the *Coleoptera* of Sokotra which have appeared up to the present year.

In the following list of the known *Coleoptera* of Sokotra and Abd-el-Kuri, seventy species in all are recorded: sixty-two from Sokotra, eight from Abd-el-Kuri, and one common to both, so that as a result of the recent expedition by Mr. W. R. Ogilvie-Grant and Dr. H. O. Forbes no less than thirty-six species have been added to those previously obtained in the Islands. Of these thirty-six species, twenty have been described as new. Nine of the species, collected by Professor Balfour in 1880, and six of those collected by Dr. Riebeck, were not obtained during the recent expedition, the total number of species collected by Mr. Grant and Dr. Forbes being fifty-four.

I.—The Beetles of Sokotra.

CARABIDÆ.

Calosoma, Weber.

1. *Calosoma rugosum*, De Geer.

Carabus rugosus, De Geer, *Insectes*, vii. p. 627.

Calosoma rugosum, Dejean, *Species* ii. p. 202.

Sokotra: Jena-agahan (1200 ft., I. 99); Homhil (1500-3000 ft., I. 99); and Hadibu Plain (XII. 98).

This species is widely distributed in Africa, occurring in Nubia, Abyssinia, Somaliland, East and South Africa.

Pheropsophus, Solier.**2. Pheropsophus sobrinus, Dejean.***Pheropsophus sobrinus*, Dejean, Species ii. p. 462.(?) *Pheropsophus africanus*, Taschenb., Zeit. f. Naturwissenschaften, lvi. p. 176 (1883).Sokotra : Hadibu Plain.—(*Riebeck*.)**Calleida, Dejean.****3. Calleida, sp.**

Sokotra : Hadibu Plain.

Tetragonoderus, Dejean.**4. Tetragonoderus flavovittatus, Waterh.***Tetragonoderus flavovittatus*, Waterh., Proc. Zool. Soc. Lond., 1881, p. 471 ; Taschenb., Zeit. f. Naturwissenschaften, lvi. p. 176 (1883).

The following is the description of the Type :—

“Length $3\frac{1}{2}$ lines. Very close to *T. quadrum*, Oliv., and of the same form and appearance. The head and thorax, however, are black (with the mandibles and the margins of the thorax slightly tinted with pitchy), very smooth, and shining. The eyes are protected posteriorly by the head partly surrounding them there. The thorax has the median channel well marked ; and in the middle of the basal margin there are some longitudinal striæ. The elytra are slightly aneous, shining, with the striæ well marked, the fourth and fifth striæ rather distinctly punctured in their basal half ; the interstices are nearly flat ; the yellow markings resemble those of *T. quadrum*, but consist of two patches on each elytron, the basal one occupying the fourth, fifth, and sixth interstices, the second one forming an undulating fascia, commencing on the third interstice and reaching to the eighth ; that portion of it which is on the fifth interstice is more removed from the apex, and nearly joins the other patch on the fourth interstice. The legs and antennæ are pale pitchy, the femora dark in the middle.”—(*Waterhouse*.)

Sokotra : Hadibu Plain.

Chlænius, Bonelli.**5. Chlænius conformis, Dejean.***Chlænius conformis*, Dejean, Species v., p. 630.

Sokotra : Jena-agahan (1200 ft.).

This species is apparently widely distributed throughout Africa, having been recorded from Senegal, Nubia, Zanzibar, and Natal.

6. Chlænius melancholicus, sp.n.

Head, prothorax and elytra of a bluish-black colour, the elytra, as a rule, being less glossy than the pronotum. Antennæ black, with the first

joint almost entirely, and the second at the apex, testaceous; fourth and following joints pubescent. Prothorax widest across the middle, narrowed thence towards the apex and, to a somewhat less extent, towards the base; its length equal to about $\frac{4}{5}$ of its width across the middle; the disc somewhat thickly but not strongly punctured. Striae of elytra impunctate, the interstices feebly convex, and very sparsely punctulate. Legs and underside pitchy black, very glossy; sides of metasternum with some rather large sparsely placed punctures; rest of underside almost impunctate. Anterior femora of the male furnished underneath near the base with a very minute tooth, this tooth being in some specimens almost or altogether obsolete.

In general form this species resembles *C. cruralis*, Fisch., but has the prothorax somewhat less narrowed towards the base. The presence in some specimens of a minute tooth near the base of the anterior femora of the male suggests also that the place for this species is in the group of *C. azureus* and *cruralis*. On the other hand, the slender last joint of the palpi, the sparser and finer puncturation of the pronotum, the very sparse puncturation of the elytra, and the almost entire absence of puncturation from the underside are characters which readily distinguish the present species from any in the group of *C. azureus*.

Sokotra: Jena-agahan (1200 ft.); Dahamis (350-1000 ft.), and Hadibu Plain.

DYTISCIDÆ.

Hyphydrus, Illiger.

7. *Hyphydrus guineensis*, Aubé.

Hyphydrus guineensis, Aubé, Species gén. des Coléopt., vi. p. 455 (1838).

Sokotra.—(*Balfour*.)

Cybister, Curtis.

8. *Cybister tripunctatus*, Oliv.

Dytiscus tripunctatus, Oliv., Ent., iii. 40, p. 14, pl. iii. fig. 24.

Trogus (Cybister) tripunctatus, Taschenb., Zeit. f. Naturwissenschaften, lvi. p. 176 (1883).

Sokotra: Hadibu Plain.—One example.

9. *Cybister punctipennis*, Taschenb.

Trogus punctipennis, Taschenberg, Zeit. fur Naturwissenschaften, lvi. p. 176 (1883).

Black, with the upper side olive green, the mouth, the lateral margins of the prothorax and elytra, the antennæ, and part of the anterior legs, yellowish. Elytra punctate.

Length, 24.275 m.m.

Sokotra.—(*Dr. Riebeck*.)

GYRINIDÆ.**Dineutes, MacLeay.****10. Dineutes æreus, Klug.**

Gyrinus æreus, Klug, in Ehrenberg's Symb. phys. iv. pl. xxxiv. fig. 8 (1834)

Dineutes æreus, Taschenb. Zeit. f. Naturwissenschaften, lvi. p. 177 (1883).

Sokotra : Hadibu Plain.—Several examples.

This species is common and rather widely distributed in East Africa.

Aulonogyrus, Motsch.**11. Aulonogyrus virescens, Régimbart (?).**

Aulonogyrus virescens, Régimb., Ann. Soc. Ent. de France (6) iii. p. 138 (1883).

Sokotra : Hadibu Plain.

I am not certain that this species is correctly determined, as in some minor points it does not agree sufficiently well with Régimbart's description. It probably is the species recorded from Sokotra by Taschenberg as *Gyrinus* sp.

HYDROPHILIDÆ.**Temnopterus, Solier.****12. Temnopterus spinipennis, Gory.**

Hydrophilus spinipennis, Gory, Icon. règne Animal, p. 72, pl. 20 fig. 14.

Temnopterus spinipennis, Taschenb., Zeit. f. Naturwissenschaften, lvi. p. 177 (1883).

Sokotra.—(Balfour.)

Found also by Dr. Riebeck.

HISTERIDÆ.**Saprinus, Erichson.****13. Saprinus elegans, Payk.**

Hister elegans, Payk., Monographia Histerorum, p. 57, pl. v. fig. 1.

Sokotra : Jena-agahan (1200 ft.).

14. Saprinus splendens, Payk.

Hister splendens, Payk., Mon. Hist., p. 53, pl. iv. fig. 7.

Sokotra.—(Dr. Riebeck.)

DERMESTIDÆ.**Dermestes, Linn.****15. Dermestes vulpinus, Fab.**

Dermestes vulpinus, Fab., Species Insect., i. p. 64.

Sokotra : Hadibu Plain.

Found also by Balfour and Riebeck.

SCARABÆIDÆ.**Scarabæus, Linn.****16. Scarabæus sacer, Linn.***Scarabæus sacer*, Linn., Syst. Nat., i. 2, p. 545.Sokotra.—(*Balfour*.)[Seen during our ascent of the Dinegan Valley, among camel dung.—*H.O.F.*]**Cheironitis, Lansberge.****17. Cheironitis socotranus, Gahan.***Cheironitis socotranus*, Gahan, Bull. Liverp. Muss., iii. 1900, p. 10.

This species somewhat closely resembles *C. scabrosus*, Fab., in the colour of the upperside, and in the tuberculation of its elytra. The tubercles of the elytra are, however, more elongated, and have a tendency to run together, forming short longitudinal carinae, while there is a continuous carina running almost the whole length of each elytron on the first interstice (counting from the suture), and another on the fifth. The body underneath, except on the sides of the metasternum, is of a dark metallic green colour; the legs are also metallic green, with the underside of the femora pale testaceous.

In the male each of the anterior femora is armed with a rather long process, which is directed obliquely so as to form an acute angle with the terminal portion of the femur, and is somewhat blunt at its extremity. Each of the middle coxæ is armed near its posterior end with two laterally compressed spines, the hinder one being slightly longer than the one in front.

Sokotra: Dahamis (350-1000 ft., XII. 98).

Aphodius, Illiger.**18. Aphodius, sp.**

Sokotra: Hadibu Plain, Dahamis, and Homhil.

Rhyssemus, Mulsant.**19. Rhyssemus senegalensis, Har.**

Sokotra: Hadibu Plain and Jena-agahan (1200 ft.).

Hybosorus, MacLeay.**20. Hybosorus illigeri, Reiche.***Hybosorus illigeri*, Reiche, Ann. Soc. Ent. France, 1853, p. 88.

Sokotra: Hadibu Plain.—One example only of this widely distributed species was obtained.

It has been recorded from South Europe, North America, North Africa, Senegal, East Africa (including Somaliland), and Arabia.

Pachydema, Castelnau.**21. Pachydema puncticeps, Waterh.**

Pachydema puncticeps, Waterh., Proc. Zool. Soc., Lond. 1881, p. 471.

The description of the Type is as follows :—

“Length 10 lines. Very robust, convex, a little flattened on the back of the elytra, subparallel at the sides. The head is rather strongly and very thickly punctured, the punctures crowded near the eyes; the clypeus is concave above, sparingly punctured, very slightly sinuate in the middle of the front margin, the margins reflexed. Thorax castaneous, one third broader than long, not very closely punctured, the punctuation more distinct above than at the sides; obliquely narrowed in front of the middle, subparallel behind the middle (viewed from above), with a very slight sinuosity, finely margined and fringed with long fulvous hairs; the posterior angles, viewed from above, appear little greater than right angles (slightly rounded), but when viewed laterally they are completely rounded off; the base is very slightly oblique on each side. Scutellum sparingly punctured on each side. Elytra much paler in colour than the thorax; at the base a very little broader than the thorax, a little wider in the middle, obtusely rounded at the apex; finely ciliated on the margins; moderately finely and not very closely punctured; each elytron has four fine, narrow smooth lines (included between lines of close, very fine punctures), the first one very slightly raised. The pygidium is very delicately and rather thickly punctured. The club of the antennæ is fuscous testaceous, not very long. The tarsi are very long; the anterior have the second, third, and fourth joints moderately dilated; the intermediate pair are only slightly so.”—(*Waterhouse*.)

Sokotra.—(*Balfour*.)

Collected also by Dr. Riebeck.

Oryctes, Illiger.**22. Oryctes vicinus, Gahan.**

Oryctes vicinus, Gahan, Bull. Liverpool Mus., iii., 1900, p. 11.

The Type, 32 mm. long, 15 broad, is about equal in size to small males of *Oryctes bovis*, Fab., and in general form somewhat resembles the latter species; but in structure and in sculpture it seems to be more nearly allied to *O. monoceros*, Oliv. The clypeus is bidentate, with the emargination between the teeth rather deep, and lined with reddish-tawny hairs; the cephalic horn in size and shape resembles that of *O. monoceros*; the prothorax is relatively wider than in *O. monoceros*, and the disc somewhat more excavate anteriorly; the elytra are shorter and broader in proportion, the sides more rounded, and the puncturation a little stronger and less dense, than in *O. monoceros*; the propygidium is very finely striate transversely over the median area,

the striae appearing to be more regular and continuous than in *O. monoceros*.

Sokotra: Hadibu Plain (l. XII. 98).—One male example of this species was obtained.

Homothyrea, Kolbe.

23. Homothyrea inornatipennis, sp.n.

Oxythyrea helenae, Waterhouse, P.Z.S., 1881, p. 470.

This species is very closely allied to *H. helenae*, Schaum, and is chiefly to be distinguished from it by the complete absence of white bands or other white markings from the elytra, and by the shortness of the apical sutural process of the elytra. One example only was obtained at Hadibu Plain: but a specimen agreeing with it in all respects was previously collected in Sokotra by Professor Balfour, and has been recorded by Waterhouse (P.Z.S., 1881) as *Oxythyrea helenae*, Schaum. The genus *Homothyrea* was established by Kolbe in 1895, to include *Leucoceles thoracica*, Schaum., and *L. helenae*, Schaum.

Sokotra: Hadibu Plain.

BUPRESTIDÆ.

Julodis, Eschscholtz.

24. Julodis clouei, Buq. (Plate xvii. fig. 6.)

Julodis clouei, Buq., Rev. Zoologique, 1843, p. 22: Id., Ann. Soc. Ent., France, 1843, pl. iv. fig. 1.

A large series of this species was obtained, showing a great amount of variation. Some specimens resemble the type figured by Buquet in *Ann. Soc. Ent. de France*, 1843, Plate iv. fig. 1, in having short tawny bands of pubescence on the elytra, but with these bands more oblique and less symmetrical. In others the tawny bands are replaced by numerous whitish spots, and the pubescence on the thorax is also whitish instead of being tawny, while the elytral derm is somewhat rugosely punctured, has a steel-blue instead of a deep violaceous-blue tint, and shows a coppery tinge in certain lights—one of these specimens is figured on Plate xvii. fig. 6. Between these extremes the various intermediate gradations occur.

This species occurs in Abyssinia.

Sokotra: Jena-agahan, Homhil, and Hadibu Plain.

[This handsome Sokotran species, which was also collected by Prof. Balfour, is remarkably variable in colour. It was commonest perhaps on the Hadibu Plain, where a considerable number were captured generally at rest on the tufts of bush-grass. The greyish bronze form was very rarely met with. During the daytime this beetle may not infrequently be seen on the wing, its handsome tawny wings rendering it a conspicuous object in flight.—*W.R.O.G.*]

ELATERIDÆ.***Alaus*, Eschscholtz.****25. *Alaus sulcicollis*, Gahan.** (Plate xvii. fig. 1.)

Alaus sulcicollis, Gahan, Bull. Liverp. Muss., iii, p. 11 (1900).

Covered above with a dense scaly pubescence which is for the most part whitish in colour, but on the head and the basal declivity of the elytra is of a dingy fulvous or brownish tint interspersed with small whitish patches; the pubescence on the underside is fulvous-brown, except over the middle of the metasternum where it has a whitish colour; the pronotum is sometimes marked with a few fulvous or brownish patches, and each of the elytra presents one or two oblong fuscous spots near the middle, and a few dark patches along the outer margin. Prothorax with each side slightly rounded anteriorly, and rather strongly sinuate posteriorly, the disc with a median groove extending from a little before the middle almost up to the base. The latter character distinguishes this species from all others belonging to the genus; for although there is a median groove present on the pronotum in *A. excavatus*, Fab., the groove is abruptly limited behind by a triangular ridge or tubercle interposed between it and the median lobe of the basal margin. In the present species there is no such ridge, and the median groove extends downwards behind to the slightly arched middle lobe of the base.

In both sexes, the last ventral segment is broadly truncate behind. The one male specimen captured is much smaller than either of the two females, and differs further in having the elytra marked with a number of fuscous lines.

Dimensions:—♂ 21 mm. long, 6.75 broad; ♀ 28 mm. long, 9.50 broad.

Sokotra: Hadibn Plain (10-15. XII. 98), ♂ ♀: Homhil (1500-3000 ft., 17-24. I. 99), ♀.

[All the examples of this species were taken at light.—*W.R.O.G.*]

RHIPICERIDÆ.***Chamærrhipis*, Latreille.****26. *Chamærrhipis bifoveolatus*, Taschenberg.**

Chamærrhipis bifoveolatus, Taschenberg, Zeit. für Naturwissenschaften, lvi, p. 177 (1883).

Chestnut-brown, densely covered with an ashy-grey pubescence, lamellæ of the tarsi ferruginous; prothorax with two small pits on the disc; elytra punctate and quadri-costate.

Length, 13-16 mm.

Sokotra.—(*Dr. Riebeck.*)

BOSTRYCHIDÆ.***Phonapate*, Lesne.****27. *Phonapate nitidipennis*, Waterh.**

Apate nitidipennis, Waterh., Proc. Zool. Soc., Lond., 1881, p. 472.

Mr. Waterhouse described the Type as under:—

"Length $7\frac{1}{2}$ lines. Forehead clothed with fulvous pile to rather above the middle of the eyes; without tubercles; the vertex finely and closely granular, with a fine smooth median line, the sides of the neck closely longitudinally rugulose. The labrum is very closely and extremely finely punctured. Clypeus moderately emarginate. Antennae pitchy, the club clear fulvous. Thorax scarcely narrower than the elytra, a trifle broader than long; the basal half closely covered with small depressed granules, the front is covered with small tubercles with rather larger ones intermixed, these latter becoming more prominent and acute towards the anterior angles; one at the anterior angles becomes a strong deflexed, recurved tooth, close to the margin. The elytra are $2\frac{1}{4}$ times as long as the thorax, a very little wider near the apex than at the base; the surface even and shining; the punctures are clear and distinct (distant from each other about twice the diameter of the larger punctures), they are fine at the base, and gradually become stronger and a little larger towards the apex, but they are very fine at the sides; in the apical declivity the punctures are very strong; on the back there are two pairs of lines of punctures on each elytron, indicating the dorsal costæ frequently seen in this genus; the spaces between them are not at all raised, except at the apical declivity, where they are very slightly inflated, but scarcely projecting; the incrassated apical margin is closely and finely punctured. The underside is obscure pitchy, clothed with fine yellowish pubescence. The legs are also pitchy; the whole of the inner side of anterior tibiæ is clothed with very pale fulvous pile; on the outer edge are three or four very small teeth. The intermediate tibiæ have on their outer edge four or five very small sharp teeth; the posterior tibiæ are smooth. The abdomen is opaque, very closely and extremely finely punctured.

"A single example, apparently a female.

"In the Museum collection there is a specimen from East Africa which differs from the above in having the elytra a little shorter, the punctuation on them rather stronger, with two fine dorsal costæ, and with an indication of a third more lateral one; the tibiæ have more teeth on their outer edge, and the posterior pair have also a few fine teeth; the abdomen is less closely punctured; the labrum is less closely punctured; the clypeus deeply emarginate, &c. I have no name for this species, and only mention it that it may not be confounded with that from Sokotra.

"Both these species appear to be nearly allied to *A. cornifrons*, Baudi de Selve (*Berl. Ent. Zeit.*, 1874, xxviii. p. 834); but that species is described as being somewhat pubescent, and the forehead of the female has a longitudinal channel and a fovea on the vertex.

"The fine frontal line in my species can scarcely be described as a channel; and there is no fovea on the vertex."

Sokotra: Dahamis.

The example collected by Professor Balfour and described by Waterhouse was a male, not a female as he supposed it to be. Both sexes are included among the specimens obtained by Dr. Forbes and Mr. Ogilvie-Grant at Dahamis.

Bostrychus, Geoffroy.

28. Bostrychus, *sp.*

Sokotra.

Rhizopertha, Stephens.

29. Rhizopertha pusilla, Fab.

Synodendron pusillum, Fab., Ent. Syst., Suppl., p. 156 (1798).

Sokotra : Jena-agahan (1200 ft.).—One example.

TENEBRIONIDÆ.

Zophosis, Latreille.

30. Zophosis æqualis, Waterh.

Zophosis æqualis, Waterh., Proc. Zool. Soc. Lond., 1881, p. 473.

The Type of this species was described as follows :—

“Length 3 lines. Oblong-ovate, not very convex ; slightly tinted with æneous. Head convex, densely and very finely punctured ; labrum not very closely but extremely delicately punctured. Thorax evenly convex, deflexed at the sides, finely margined anteriorly, twice as broad as long, arcuately narrowed anteriorly, very closely and extremely delicately punctured. Elytra as broad as the base of the thorax, nearly straight at the sides, arcuately narrowed at the apex, moderately convex ; the punctuation is extremely fine, but rather more distinct than on the thorax, and decidedly less close ; on the margin, near the apex, some of the punctures are longitudinally asperate ; the epipleural line is completely marginal ; the epipleuron has a few short longitudinal impressed lines. The antennæ are black ; the second and fourth joints are nearly equal, both a trifle shorter than the third. The spurs on the tibiæ are reddish. The prosternal process is elongate-ovate, moderately broad, finely margined, extremely delicately, and not very thickly punctulate.

“Some of the specimens have the epistoma separated from the forehead by a fine sinuous line, in the middle of which is a shallow fovea ; the epistoma is more strongly punctured ; and the elytra have more asperate punctures along the whole margins. I take these to be merely varieties, as they vary somewhat among themselves.

“This species appears, from M. Deyrolle’s Monograph, to be nearly allied to *Z. elongata*, Deyr. (*Ann. Soc. Ent. Fr.*, 1867, vii. p. 219) ; but that species has evidently much more asperate punctuation on the sides of the elytra, &c.”—(*Waterhouse*.)

Sokotra : Adho Dimellus (3500 ft.), Homhil (1500 ft.), and Hadibu Plain.

Histeromorphus, Kraatz.**31. Histeromorphus plicatus, Kraatz.***Histeromorphus plicatus*, Kraatz, Revision Tenebrioniden, p. 12.

Several examples of this species were obtained. Those from Hadibu Plain are all characterised by having the elytra very strongly plicate especially towards the sides, much more so indeed than in typical specimens from Abyssinia, so that at first sight they would seem to be specifically distinct. But as the specimens from the other localities named exhibit considerable variation, some having the elytra almost quite smooth, while in others they are almost as strongly plicate as in the examples from Hadibu Plain, I am forced to consider all the examples as belonging to one extremely variable species.

Sokotra : Jena-aganan, Homhil, Dahamis, and Hadibu Plain.

32. Histeromorphus plicatipennis, Waterh.*Histeromorphus plicatipennis*, Waterh., Proc. Zool. Soc., Lond., 1881, p. 473, pl. xliii. fig. 1.

HISTEROMORPHUS PLICATIPENNIS.*

Mr. Waterhouse described the Type as follows :—

“Length 4 lines. This species is much smaller than *H. plicatus*, Kz., but has almost precisely the same form. It is at once distinguished by the remarkable plicate elytra. Each elytron has four zigzag striae (besides a portion of a fifth on the side) : the space between the first and second striae is only slightly convex ; the three following interstices are very convex and are zigzag in the same way as the striae, impunctate ; the apex of the elytra is flattened above, but scarcely reflexed.”

Sokotra.—(*Balfour*.)

[We did not meet with this species.—*H.O.F.*]

Rhytidonota, Eschscholtz.**33. Rhytidonota exigua, Gahan.***Rhytidonota exigua*, Gahan, Bull. Liverpool Mus., iii. p. 8 (1900).

Head densely punctulate, antennae scarcely reaching beyond the middle of the pronotum, with the third joint about half as long again as the

* All the figures in the text of this paper are from the *Proceedings of the Zoological Society of London*, with the kind permission of the Council.—*Editor*.

second, the fourth appreciably shorter than the second, the fifth and following joints gradually and but very slightly decreasing in length, and the eleventh narrower than the tenth. Prothorax densely and minutely punctulate, slightly rounded at the sides, widest a little in front of the middle, and thence narrowed to the base and apex, being a little narrower across the apex than at the base, where the width is almost equal to the length of the pronotum along the middle. Elytra ovate, about two and a half times as long as the pronotum, finely and rather sparsely punctulate, and each impressed along the disc with five or six shallow and nearly obsolete grooves.

Length 7·5-8·5 mm. ; breadth (at mid. of elytra) 3·25-3·5 mm.

Sokotra : Homhil, East Sokotra (1500-3000 ft.).—Eight examples

34. *Rhytidonota socia*, Gahan.

Rhytidonota socia, Gahan, Bull. Liverp. Muss., iii. p. 9 (1900).

This species has the same dull black colour as the preceding species, which it closely resembles also in size and shape. It differs from it as follows:—The antennæ are longer, reaching quite to the base of the pronotum, less closely punctulate, and with the second joint relatively shorter, being less in length than the fourth joint and little more than half as long as the third ; the pronotum is more parallel-sided, and its width across the base is a little greater than its length along the middle.

Sokotra : Adho Dimellus (3500-4500 ft.).

Eusyntelia, Waterhouse.

Eusyntelia, Waterhouse, P.Z.S., 1881, p. 473.

Mesosternum sloping, more or less concave. Eyes subreniform, not divided by a lamina, not prominent laterally. Head below with a deep transverse impression, above with a ridge over each eye. Epistoma with a somewhat acute projection in the middle of the front margin, the labrum distinctly visible from above. Antennæ with the third joint scarcely twice as long as the second. Body not very convex, not pubescent. Thorax as broad or rather broader than long, the sides gently arcuate. The elytra with distinct shoulders, about one third longer than the head and thorax together, margined at the base, somewhat produced at the apex.

“The species upon which I establish this genus very much resembles *Thalpophila abbreviata*, Fabr., in form, but is shining black or without pubescence. It has, however, the gular line transverse and not oblique at the sides, as in *Thalpophila*. I propose to place it before *Tentyria* (following Dr. Kraatz in classification), so that it may come in proximity to those genera which have the labrum exposed.

“The second species closely resembles the first, but has the throat more approaching that of *Anatolica*.

“The third species somewhat resembles a species of *Dichomma*.”—(*Waterhouse*.)

35. *Eusyntelia opacicollis*, Gahan. (Plate xvii. fig. 5.)*Eusyntelia opacicollis*, Gahan, Bull. Liverp. Mus., iii. p. 9 (1900).

Head and pronotum closely and distinctly punctulate and opaque, the punctures on the head being somewhat larger than those on the pronotum. Pronotum widest between the middle and the anterior margin, its sides there being distinctly areuate, while from the middle to the base they are almost rectilinearly convergent; its length along the middle a little greater than its width across the base. Elytra rather strongly sulcate, with the interstices convex and somewhat closely punctulate.

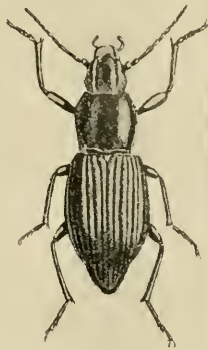
Length 12·0-15·0 mm. ; breadth (at mid. of elytra) 4·5-6·0 mm.

Sokotra : Jena-agahan (1200 ft.) and Hadibu Plain.

This species is most nearly allied to *E. ebenina*, Waterh., which it resembles in size and form, but from which it may be distinguished at first sight by the dulness of its whole upper surface, the head and pronotum especially being closely and very distinctly punctulate, while the same parts in *E. ebenina* are very sparsely and minutely punctulate and the surface highly polished. In the latter species also the length of the pronotum is only about equal to, or scarcely appreciably greater than its width across the base, and is, therefore, relatively a trifle shorter than in *opacicollis*. *Eusyntelia balfouri*, Waterh., differs from both of these species by its shorter antennæ and its broader pronotum, the width of the latter across the base being distinctly greater than its median length; in the figure of this species (Proc. Zool. Soc., 1881, pl. xliii, fig. 5) the form of the pronotum is inaccurate, and more nearly represents the shape occurring in *ebenina* and *opacicollis*.

36. *Eusyntelia balfouri*, Waterh.

Eusyntelia balfouri, Waterh., Proc. Zool. Soc. Lond., 1881, p. 474, pl. xliii. fig. 5.



EUSYNTELIA BALFOURI.

The following is the original description of the Type of this species:—

“Length $6\frac{1}{2}$ - $8\frac{1}{2}$ lines. Head finely or moderately thickly punctured, with several irregular longitudinal impressed lines on the forehead, deeply impressed within the ocular ridge; the clypeus produced in the middle into a point, which is slightly bent down at the apex. Eyes not much convex, slightly reniform, the upper part the larger, not so prominent as the head in front of the eye, supported posteriorly by a swelling of the neck. Thorax not quite twice as broad as the head, about one fifth broader than long, only gently convex; finely margined all round, except in the middle of the anterior margin; arcuately emarginate in front, slightly narrowed in front and behind; the anterior angles blunt; the sides gently arcuate; the posterior angles a little greater than right angles and blunt; the base scarcely sinuate on each side, gently lobed in the middle. Scutellum small. Elytra at their base not broader than the base of the thorax, and fitting close to it, gradually and slightly widening to the middle, and then again narrowed to the apex, not very convex, rather depressed on the back; rather strongly and obtusely sulcate, the interstices rather convex, extremely delicately and not very closely punctured: the apex somewhat produced and impressed above. Antennæ as long as the head and half the thorax. Posterior tibiæ closely and rather strongly punctured on their upper edge, the punctures almost asperate.”

Sokotra: Jena-agahan (1200 ft.) and Adho Dimellus (3500 ft.).

37. *Eusyntelia ebenina*, Waterh.

Eusyntelia ebenina, Waterh., Proc. Zool. Soc., Lond., 1881, p. 474.

The following is Mr. Waterhouse's description of the Type:—

“Length $7\frac{1}{2}$ lines. This species is very close to the preceding, but is at once distinguished by the thorax being rather narrower, more convex in front, rather more narrowed behind, and the sides, instead of being regularly arcuate, are somewhat rectilinear behind the middle. The antennæ are rather longer. The head is more delicately punctured; and there are no longitudinal impressed lines on the forehead. The thorax is almost entirely smooth, a few excessively fine punctures being visible near the posterior angles. The punctures on the posterior tibiæ are finer, and distinctly separated from each other.

“This species so closely resembles *S. balfourii* in all its general characters and appearance that it occurred to me that the differences might, perhaps, be sexual; this, however, I have, by dissection, proved not to be the case.”

Sokotra.—(*Balfour*.)

38. *Eusyntelia glabra*, Waterh.

Eusyntelia glabra, Waterh., Proc. Zool. Soc., Lond., 1881, p. 475, pl. xliii. fig. 6.

The following is the original description of the Type:—

“Length $5\frac{1}{2}$ lines. Elongate-ovate, moderately convex, glabrous. Anten-

nae moderately short, shining, not very thickly but very finely punctured. Head moderately thickly and very distinctly punctured; the ocular ridge moderately strong; the projection in the middle of the margin of the clypeus rather small and acute. Thorax nearly twice as broad as the head, about one fifth broader than long, a very little more narrowed in front than behind, gently convex; finely margined all round (except, perhaps, in the middle of the anterior margin); very finely and rather closely punctured, and evenly so all over; the anterior angles moderately prominent; the sides moderately and perfectly evenly arcuate; the posterior angles are rather greater than right angles (about 120°); the base is broadly and gently lobed in the



EUSYNTELIA GLABRA.

middle. Elytra about one quarter longer than the head and thorax together, rather convex, a little flatter on the back; at the base a very little broader than the base of the thorax, gradually and evenly enlarged to the middle (where their width is equal to the length of the head and thorax together), then narrowed again to the apex, which is very slightly produced; each elytron has four or five rather obscure impressed channels (obsolete at the base); the second, third, and fourth interstices are very gently convex; the punctuation, although not sparse, is very fine and obscure, and in parts scarcely visible."

Sokotra: Dahamis (350 ft.); Jena-agahan (1200 ft.); Adho Dimellus (3500 ft.); Homhil (1500 ft.), and Hadibu Plain.

Adelostoma, Duponchel.

39. Adelostoma bicarinatum, Waterh.

Adelostoma bicarinatum, Waterh., P.Z.S. Lond., 1881, p. 475, pl. xliii. fig. 3.

The Type was described as follows:—

"Length $2\frac{1}{2}$ lines. A short, broad species. Head closely and rugosely punctured, scarcely impressed on each side above, slightly broader posteriorly than in front, nearly straight sided; the median carina is fine, and is continued back to the vertex; the ocular carina is very short. Thorax very closely and rugosely punctured, at the anterior angles very slightly broader than the head, much broader behind the

middle, narrowed again at the base, gently reflexed at the sides, with two strong dorsal costæ; the anterior angles, although not very acute, are decidedly prominent; the sides are strongly angular considerably behind the middle; the base is divided into three equal parts by the



points of juncture with the dorsal carinæ. Elytra one quarter longer than broad, depressed, rather suddenly deflexed at the apex: each elytron with three well-marked costæ, the second distinctly abbreviated at the base and apex; the first interstice with two lines, the second and third with three lines of strong deep punctures. Legs obscure pitchy."

Sokotra.—(*Balfour.*)

Ocnera, *Fischer.*

40. *Ocnera setosa*, *Ménétries.*

Ocnera setosa, Ménétries, Cat. raisonné, p. 192 (1832).

Sokotra.—(*Balfour.*)

Opatrum, *Fabr.*

41. *Opatrum costiferum*, *Waterh.*

Opatrum costiferum, Waterh., Proc. Zool. Soc. Lond., 1881, p. 476, pl. xliii. fig. 2.



OPATRUM COSTIFERUM.

The following is the original description of the Type:—

"Length 6 lines, breadth 4 lines. Head covered with small, round, shining, black granules placed moderately close together. The clypeus has its front margin straight on each side of the deep triangular incision; at the sides it is suddenly obliquely turned back, so as to form an obtuse angle with the antennal orbits. The third joint of the antennae is at least as long as the three following joints together; the fourth joint is a trifle longer than broad, the fifth to eighth are nearly globular; the ninth and tenth are distinctly transverse, and a little broader than the eighth; the eleventh is nearly globular, scarcely narrower than the tenth. The thorax is twice as broad as its length in the middle, deeply emarginate in front for the reception of the head, convex on the disc, impressed at the sides, arcuately narrowed in front of the middle; the anterior angles are blunted right angles; the sides behind the middle are parallel; the posterior angles are blunt, and a little greater than right angles; the base is broadly lobed in the middle, the lobe itself straight next the scutellum; all the disc rather closely covered with depressed conical black tubercles; there is a fine median impressed line. Elytra at the base scarcely broader than the thorax, a trifle broader at the middle, scarcely longer than broad, very convex, descending at the apex, very gently arcuate at the sides; each elytron has seven slightly raised broad tectiform costae, a line of small round obtuse tubercles being ranged along the summit of each costa. Tarsi short and thick."

"This species has somewhat the appearance of *Saragus lericollis*, Oliv., and at first sight would scarcely be taken for an *Opatrum*."

Sokotra: Jena-aghan (1200 ft.).—One example.

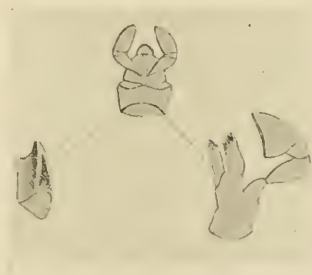
42. *Opatrum*, *sp.*

Another example of this genus was obtained. It resembles *O. costiferum*, Waterh., in general form and in having costate elytra, but it is less than half the size of that species.

Sokotra: Homhil (1500 ft.).

Apithesis, *Waterhouse.*

Apithesis, Waterhouse, P.Z.S. Lond., 1881, p. 476, pl. xliii. fig. 4a.



MOUTH ORGANS IN APITHESIS

"Mentum transversely trapeziform, narrowest at the base ; labial palpi short and thick, the apical joint large, thick at the base, narrowed towards the apex. Inner lobe of the maxilla terminating in a horny hook ; the palpi moderately large, the apical joint strongly securiform. The mandibles emarginate at their apex. Labrum transverse, projecting and exposed, entire. Head imbedded in the thorax as far as the eyes : the epistoma separated from the forehead on each side by a fine line, the front margin emarginate. Eyes moderately transverse, the canthus half dividing them ; the upper and lower parts nearly equal. Antennæ rather short ; the second joint a little longer than broad ; the third twice as long as the second ; the fourth a little longer than the second ; the fifth and sixth shorter ; the seventh as long as broad, very narrow at its base, very broad at the apex ; the eighth nearly an equilateral triangle ; the ninth and tenth very transversely cup-shaped ; the eleventh nearly as broad as the tenth joint, flat, somewhat circular in outline. Thorax as in *Alphitobius*, but more convex, and with the lateral margins slightly impressed. Elytra very convex, very little broader than the thorax, very little longer than broad, descending at the apex, strongly striated, the epipleural fold rather broad at the base, gradually narrowed posteriorly, terminating suddenly a little way from the apex. Legs slightly rough and finely pubescent ; the tarsi clothed beneath with close fine hair ; the anterior tibiæ more linear than in *Alphitobius*. Anterior coxæ slightly transverse. Prosternum arched between the coxæ, very slightly produced posteriorly. Mesosternum sloping and gently concave. Metasternum short. Body above not pubescent. Wings none.

"I have great difficulty in placing this genus ; but, on the whole, it seems best arranged near *Alphitobius*, although its broader and convex form gives it a different appearance ; the tibiæ are more linear than in that genus, and the whole legs more punctured and pubescent. The under flanks of the thorax are concave as in *Crypticus quisquilius*, but it has not the longer slender legs as in that insect. It is apterous ; a character which is hitherto foreign to the *Ulominæ*, but which I do not consider a fatal bar to its being placed in that sub-family."

—(*Waterhouse*.)

43. *Apithesis obesa*, *Waterh.*

Apithesis obesa, *Waterh.*, Proc. Zool. Soc. Lond., 1881, p. 477, pl. xliii. fig. 4.

The following is the description of the Type :—

"Length $3\frac{1}{2}$ lines. Head closely and rather strongly punctured ; clypeus very closely and more finely punctured, oblique at the sides, emarginate in front, the margin pithy. Thorax convex, twice as broad as its length in the middle, gradually arcuately narrowed from the base to the front ; moderately, thickly, evenly, finely, but distinctly punctured ; the sides narrowly impressed above, very delicately margined ; the pos-

terior angles slightly acute ; the base rather strongly sinuate on each side, finely margined ; on each side, almost on the margin, is an abbreviated impressed line, particularly visible when viewed from behind. Elytra at the base as broad as the thorax, a little wider posteriorly, where they are more convex, declivous at the apex ; each



APITHESTS OBESA.

elytron has eight rather strongly impressed, finely and closely punctured striae, the fourth and fifth much shorter than the others, and united posteriorly ; the interstices are slightly convex, opaque, finely and rather thickly punctured."—(*Waterhouse.*)

Sokotra.—(*Balfour.*)

HELOPINÆ.

Deretus, *Gahan.*

Deretus, Gahan, Bull. Liverp. Muss., iii. p. 10 (1900).

This genus seems to be most nearly allied to *Enbæus*, Boield., from which it differs chiefly in the shape of the pronotum. The pronotum is narrowed at the base, and at the lateral margin on each side between the base and the middle there is a short blunt tooth, behind which the margin is rather deeply sinuate, while between it and the middle there is a feebler sinuation. The clypeus is broadly rounded in front, not truncate nor emarginate as in *Enbæus* ; the antennæ are a little shorter and more slender than in the latter genus, and the proximal joints of the hind tarsi somewhat shorter. In other points of structure the agreement between the two genera is fairly complete.

44. *Deretus denticollis*, *Gahan.* (Plate xvii. fig. 9.)

Deretus denticollis, Gahan, Bull. Liverp. Muss., iii. p. 10 (1900).

Dark brown and somewhat glossy. Head and prothorax almost quite black above, both very closely and rather strongly punctured ; labrum transverse, thickly punctured, united to the clypeus by a narrow and smooth coriaceous band ; eyes transversely ovate in form. Antennæ of the female less than half as long as the body, with the joints from the fourth to the eleventh sub-equal in length, each being about two-

thirds of the length of the third joint, and the last three or four somewhat broader than the others. Posterior margin of pronotum almost straightly transverse, the anterior margin slightly curved forwards towards the outer angles, the latter being somewhat rounded. Elytra each with ten rows (including the very short juxta-sutural row) of punctures, with the intervals between the rows slightly convex, and sparsely and feebly punctured. Underside and legs very closely punctured.

Sokotra : Jena-agahan (1200 ft.).

CISTELIDÆ.

Allecula, Fabr.

45. *Allecula*, *sp.*

Sokotra : Jena-agahan (1200 ft.).—Two examples.

ANTHICIDÆ.

Anthicus, Paykull.

46. *Anthicus floralis* (Linn.).

Meloe floralis, Linn., Fauna Suecica, p. 228 (1761).

Sokotra : Adho Dimellus (3500 ft.).—One example.

MELOIDÆ.

Meloe, Linn.

47. *Meloe trapeziderus*, *sp.n.*

This species is readily distinguished from others of the genus by the form of its prothorax. The latter is broadest in front, with its anterior angles acute ; its sides are vertically deflexed, and converge strongly in straight lines from the apex to the base ; the disc is almost quite flat, strongly rugose-punctate, and without a groove or impression along the middle. The head and prothorax are purplish-blue coarsely punctured. The antennæ reach but little beyond the base of the elytra ; the joints from the third to the eighth are sub-equal in length and thickness, each being nearly as broad as it is long, the ninth and tenth joints are each a little longer than the eighth, and the eleventh is nearly twice as long as the ninth. The elytra blue, irregularly rugose ; dorsal segments of the abdomen dark blue, each having a postero-median semicircular shiny spot.

Sokotra : Jena-agahan (2000 ft.).

48. *Meloe*, *sp.*

Sokotra : Dahamis (350 ft.).—One example.

CURCULIONIDÆ.

Piazomias, Schönherr.

49. *Piazomias vermiculosus*, Waterh.

Piazomias vermiculosus, Waterh., Proc. Zool. Soc. Lond., (1881), p. 478.

The Type was described by Mr. Waterhouse as under :—

“Length 6-7 $\frac{1}{4}$ lines. This species has much the form and general appearance of *Herpystichus eremita*. Rostrum nearly parallel, flattened above, longitudinally rugulose, with a fine impressed median line reaching nearly to the vertex; and on each side there is a longitudinal impression. The eyes are moderately prominent, rather less than a semi-circle viewed from above. Thorax a trifle broader than long, truncate in front and behind, moderately rounded at the sides, broadest rather behind the middle; slightly depressed on the disc, with a well-marked median channel, which does not reach the front margin; all the surface (except the anterior border) vermiculose, and divided into rather irregular round areas, which have generally one puncture about the middle; the disc is covered with pale scales, and there are some very pale scales at the sides; the base is margined. Scutellum very small, shining black. Elytra at the margined base a very little wider than the base of the thorax, but immediately becoming wider (without, however, making any distinct shoulders), oblong-ovate, convex, sloping down and somewhat acuminate at the apex, strongly striated, the striae strongly but not closely punctured; the interstices almost flat, covered with sandy grey scales, with small dots of a paler colour at intervals on the striae; the scales on the margin of the elytra and on a spot on the hinder femora are also paler. Tarsi grey.”

Sokotra: Jena-agahan (1200 ft.), and Hadibu Plain.

Systates, Gerstaecker.

50. *Systates angusticollis*, Taschenberg.

Systates angusticollis, Taschenberg, Zeit. für Naturwissenschaften, lvi. p. 179 (1883).

Black, and somewhat glossy; with a faint greyish-white pubescence. Antennae filiform, with a whitish pubescence at the apex. Prothorax sub-cylindrical, pitted above. Elytra somewhat globose, pitted in rows with the interstices raised.

Length 5.5, breadth 3 mm.

Sokotra.—(*Dr. Riebeck*.)

Four species of *Curculionidae*, in addition to the one referred to above, were collected by the Expedition. Two (51, 52) of these, belonging to *Systates* or some closely related genus, were found in Sokotra, the remaining two having been obtained in the island of Abd-el-Kuri.

BRENTHIDÆ.

Ceocephalus, Schönherr.

53. *Ceocephalus picipes*, Oliv.

Brentus picipes, Oliv., Entomologie, v. No. 84, p. 442, pl. ii. fig. 18.

Ceocephalus picipes, Taschenb. Zeit. f. Naturwissenschaften, lvi. p. 179 (1883).

Sokotra.—(*Dr. Riebeck*.)

CERAMBYCIDÆ.**Mallodon, Serville.****54. Mallodon arabicum, Buquet.**

Mallodon arabicum, Buquet, Rev. Zoologique, 1843, p. 330; Waterhouse, Proc. Zool. Soc. Lond., 1881, p. 478, pl. xliii. fig 7.



MALLODON ARABICUM.

A series of specimens, including both sexes, of this species were collected by Mr. Grant and Dr. Forbes. The largest male measures over 60 mm. in length (mandibles included), while the smallest is not more than 34 mm. long. The original specimens described by Buquet were, he says, found by M. Cloué, "sur les côtes d'Arabie."

Sokotra : Dahamis (350 ft.) ; Homhil (1500 ft.), and Hadibu Plain.

[All the examples of this fine longicorn were found in holes in rotten trees. On one occasion at Homhil I saw the head of a very large specimen protruding from a hole, and attempted to extract it with the aid of a pair of forceps. The beetle absolutely refused to let go its hold, and as force was gradually brought to bear its thorax telescoped to an alarming extent. After several minutes its grasp suddenly relaxed, and I found on extracting the Mallodon that it was perfectly dead. I feel certain that this species was obtained by M. Cloué in Sokotra along with *Julodis clouéi*, and does not occur in Arabia.—*W.R.O.G.*]

Æme, Newman.**55. Æme fusca, Gahan.** (Plate xvii. fig. 2.)

Æme fusca, Gahan, Bull. Liverp. Mus., iii. p. 12 (1900).

Dark brown in colour, varying in parts to brownish-testaceous, covered with a faint greyish pubescence. Antennæ of the male more than half

as long again as the body ; those of the female a little longer than the body ; joints third to fifth shortly spinose underneath. Elytra closely punctured, the disc of each marked with two raised lines.

Notwithstanding its habitat, this species seems to be correctly placed in the genus *Eme*, and to be not very distantly allied to the North-American species *E. linearis* from which it is chiefly distinguishable by its darker colour, somewhat broader form, less deeply emarginate eyes, less strongly spinose antennæ, and shorter abdomen.

Length 13.0-16.0 mm., breadth 2.6-3.5 mm.

Sokotra : Dahamis (350-1000 ft., XII. 98).

[All the examples of this species were obtained from one or two dead trees in the neighbourhood of our camp at Dahamis.—*H.R.O.G.*]

Coptops, Serville (?).

56. Coptops hieroglyphica, Taschenberg.

Coptops hieroglyphica, Taschenberg, Zeit. für Naturwissenschaften, lvi. p. 179 (1883).

Vertex of head unarmed ; eyes approximated ; prothorax with three tubercles, and with two anterior and two posterior transverse grooves ; elytra rough, furnished with two basal teeth and deep punctures, obliquely carinate behind ; middle tibiæ grooved. Body black, covered with a grey pubescence mixed with rusty-brown and white ; prothorax with a darker rhomboidal plaga in the middle, and four white specks in a row near the base ; elytra also with some darker markings.

Length 9-17 mm.

Dr. Taschenberg has referred this species with some doubt to the genus *Coptops* ; and one of the characters given by him—"tibia media sulcata"—indicates that the species certainly cannot be a true *Coptops* ; but the other characters mentioned do not sufficiently relate to structure to enable me to identify the genus or even the group to which it belongs. The size and coloration of the species suggest that it may find a place in *Idactus*, and may possibly be identical with the following species.

Sokotra.—(*Dr. Riebeck.*)

Idactus, Pascoe.

57. Idactus granti, Gahan. (Plate xvii. fig. 10.)

Idactus granti, Gahan, Bull. Liverp. Mus., iii. p. 12 (1900).

Allied to *I. maculicornis*, Gahan, and differing from it as follows:—

Pubescence much paler in colour ; elytra longer and less convex, without tufts of hairs, and with the two tubercles near the base of each much smaller ; pygidium of the female without the two tufts of tawny hairs which are present in the female of *maculicornis*.

Length 10.0-15.0 mm., breadth 4.6 mm.

Sokotra : Dahamis (350-1000 ft.); Jena-agahan (1200 ft.); Honihil (1500 ft.); and Hadibu Plain.

[Mostly found in dead trees, but a good many were captured at the lanterns of an evening.—*H.R.O.G.*]

Sybrinus, Gahan.

Sybrinus, Gahan, Bull. Liverp. Muss., iii. p. 12 (1900).

Head slightly transverse in front, feebly concave above between the antennal tubercles; eyes coarsely faceted, deeply emarginate with the lower lobes slightly transverse. Antennæ of the male about half as long again as the body, those of the female about reaching to the apex of the elytra, fourth joint equal in length to the second and third united, and scarcely longer than the first, fifth shorter than fourth, sixth to eleventh gradually diminishing in length. Prothorax unarmed, and slightly rounded at the sides, its length about equal to its width across the base. Elytra broader than the prothorax, nearly parallel-sided in their anterior two-thirds, and thence narrowed to the apex. Legs rather short; with the femora stout and clavate; tibiæ of the middle pair notched on the outside below the middle, those of the hind pair sinuate on the outer border below the middle, and furnished with a row of short stiff setæ; tibiæ of the anterior pair with a finely serrate ridge along the outer border; claws of the tarsi widely divergent. Prosternal process slightly arched in the middle, rather widely dilated behind the coxæ. Mesosternal process with a small angular dilatation on each side near its extremity. Intermediate coxal cavities almost completely closed in externally.

This genus belongs to the group *Ptericoptides*, and seems best placed near *Sybra*, Pasc., which it approaches in general form and in many of its structural characters, differing chiefly in its more widely divergent tarsal claws, in its relatively longer scape and shorter third joint of the antennæ, and in the presence of a serrate ridge on the outer border of the anterior tibiæ.

58. *Sybrinus commixtus*, Gahan. (Plate xvii. fig. 8.)

Sybrinus commixtus, Gahan, Bull. Liverp. Muss., iii. p. 12 (1900).

Closely covered with a fulvous or fulvous-grey pubescence. Disc of prothorax with a broad sub-glabrous fuscous band, closely and rather strongly punctured, extending along the middle from the base to the apex. Elytra with small fuscous spots anteriorly and along the sides, each with a large oblique cinereous patch, followed by a lunate blackish brown spot, placed a little in front of the apex; the elytra are punctured, with the punctures visible only where the pubescence has been rubbed away, and each shows indications also of three or four slightly raised longitudinal lines.

Length 11.0 mm., breadth 3.5 mm.

Sokotra : Adho-Dimellus (3500-4000 ft., H. 99).

[I believe all the examples of this longicorn were taken at light, mostly on our dining table.—*H.R.O.G.*]

59. *Sybrinus*, *sp.*

Very like the preceding species, of which it may prove to be a variety, the chief differences noticeable being (1) the presence of an elongated dark brown patch on the intermediate third of each elytron about mid-way between the suture and the outer margin, and (2) the smaller extent of the cinereous patch on the hinder part of each elytron.

Sokotra : Jena-agahan (1200 ft.).—One female example.

60. *Sybrinus simonyi*, *sp. n.*

In this species the pubescence covering the elytra is of a nearly uniform greyish-tawny colour, this colour being varied only by some small and inconspicuous cinereous specks, arranged somewhat in longitudinal rows. The underside and legs are covered with a pubescence very similar in colour to that on the upperside, but varied more with small brownish spots.

Length 9.0 mm., breadth 3.0 mm.

Sokotra : Jena-agahan.—One male example.

This species is dedicated to Prof. Oscar Simony, a well-known naturalist and keen entomologist, a member of the Expedition of the Imperial Academy of Sciences of Vienna, engaged in the exploration of Sokotra at the same time as Dr. Forbes and Mr. Grant, in remembrance of their pleasant meeting there.

EUMOLPIDÆ.

Eryxia, *Baly*.

61. *Eryxia socotrana*, *sp. n.*

Dark metallic green having on the upperside a slight coppery tint ; thinly clothed with a short adpressed grey pubescence. Antennae ferruginous with the last five joints, which are slightly dilated and compressed, more or less infusate. Head closely and finely punctulate ; prothorax transverse, rounded and distinctly marginate at the sides, closely and rather strongly punctulate above ; elytra densely punctulate with the punctures somewhat unequal in size. Intercostal process of the prosternum very much broader than in *E. holosericea*, Klug (= *baikii*, Baly), and only slightly convex in the middle ; the intercostal process of the mesosternum a little narrower than that of the prosternum. Tibiæ without trace of emargination on the outer side.

A species from Aden, which I have determined from the description to be the *Eryxia grandis* of Lefevre, is closely allied to the present one, differing chiefly by its smaller size, and relatively shorter and broader

elytra. This species also differs from *E. holosericea*, Klug, the type of the genus *Eryria*, in having the prosternum very much broader between the coxae.

Length 7·5-9·0 mm.

Sokotra : Hadibu Plain.

COCCINELLIDÆ.

Epilachna.

62. *Epilachna chrysomelina*, var. *reticulata*, Oliv.

Coccinella reticulata, Oliv., Encycl. Méth., vi. p. 56 (1791); *Epilachna reticulata*, Mulsant, Species des Col. Trimères, p. 794.

Sokotra : Homhil (1500 ft.).—One example.

II.—The Beetles of Abd-el-Kuri.

MELYRIDÆ.

Melyris.

1. *Melyris insularis*, Gahan. (Plate xvii. fig. 3.)

Melyris insularis, Gahan, Bull. Liverp. Muss., iii. p. 8 (1900).

This species is chiefly distinguishable by the form of the prothorax, the sides of which are almost straight, and continuously divergent from the apex to the base, with the posterior angles slightly acute, and prominent. It is of a metallic-green colour, with the abdomen, the legs, and the last five or seven joints of the antennæ, black, and the remaining joints of the antennæ, except the first, testaceous.

Abd-el-Kuri.

PTINIDÆ.

Paranobium. Gahan,

Paranobium, Gahan, Monogr. Christmas Id., p. 104 (1900).

The genus *Paranobium* was founded for the reception of a species—*P. posticum*, Gahan—collected in Christmas Island, Indian Ocean, and figured and described in the “Monograph” of that island. In this genus the prosternum is not excavated for the reception of the head, and extends but a short distance in front of the anterior coxæ; the latter are rather closely approximated to one another, the intercoxal process being short and narrow. Each of these coxæ fits behind into an excavation formed partly from the mesosternum, and in part from the mesothoracic episternum, the two excavations in the mesosternum being separated in front by a median vertical lamella. This structure of the sterna is very much the same as occurs in the genus *Hedobia*; and in certain other respects *Paranobium* shows considerable affinity with that genus, but it differs in having a relatively broader prothorax (which approximates more to the form characteristic of *Priobium*), and in having the antennæ inserted widely apart, and close up to the margin of the eyes, closer even than is the case in the genus *Priobium*. From *Priobium*, *Paranobium* is distinguished by the structure of the antennæ and of the mesosternum, as well as by the absence of a stridulating area from the gular surface of the head, this surface in *Paranobium* being smooth and nitid and limited on each side by a nearly straight sutural line, whereas in *Priobium*, and in *Dryophilus* also, the underside of the head has a transversely oval area, which is striated finely throughout nearly all its extent in * *Dryophilus*, towards the sides only in *Priobium*.

* I have so far examined this structure only in one species of *Dryophilus*—*D. pusillus*, Germ.

2. *Paranobium forbesii*, *sp. n.*

Pitchy-brown in colour, the head and prothorax being slightly darker than the elytra; clothed with a greyish pubescence, which is not sufficiently dense to mask the colour of the derm. Antennæ testaceous; the joints from the third to the tenth somewhat triangular in form, and nearly equal to one another in length. Prothorax appearing somewhat globular in form when looked at from above, distinctly narrower than the elytra, its upper surface finely and closely granulate. Elytra densely and rather strongly punctate. The fifth joint of each of the tarsi almost equal in length to the first, this joint being about as long as the second and third united.

Length 8.0, breadth 3.0 mm.

Abd-el-Kuri.—One example.

TENEBRIONIDÆ.***Zophosis*, Latreille.****3. *Zophosis undulata*, Gahan.**

Zophosis undulata, Gahan, Bull. Liverp. Muss., iii. p. 8 (1900).

This species is closely allied to *Zophosis æqualis*, Waterh., but is relatively broader, and is easily distinguished at first sight by the slightly raised and obtuse undulate ridges running along the elytra. It differs also in having the upper part of the head less closely punctulate, and the pronotum distinctly but rather sparsely punctulate.

Length 7.0 mm., breadth 3.5 mm.

Abd-el-Kuri.—Two examples taken (22. II. 99).

Histeromorphus*, Kraatz.*4. *Histeromorphus undatus*, Gahan. (Plate xvii. fig. 7.)**

Histeromorphus undatus, Gahan, Bull. Liverp. Muss., iii. p. 8 (1900).

In size and general form this species somewhat closely resembles *H. plicatus*, Kraatz, but may be easily distinguished from it by the following characters. The clypeus is almost straightly truncate or but very feebly sinuate in front, whereas in *H. plicatus* it is arcuately emarginate; the sides of the prothorax have a broader margin, and converge more strongly in a more regular arcuate curve from the base to the apex; the elytra are more regularly plicate in wavy lines running parallel to one another in a transverse direction.

Length 8.5-11.0 mm., breadth 6.5-8.0 mm.

Abd-el-Kuri.—Ten examples captured 22. XII. 98, and 22. II. 99.

Rhytidonota*, Eschsch. (?).*5. *Rhytidonota* (?) *tibialis*, Gahan.**

Rhytidonota (?) *tibialis*, Gahan, Bull. Liverp. Muss., iii. p. 9 (1900).

This species is very distinct from *R. exigua* and *R. socia*; and, in certain of

its characters, such as the form of the prosternal process, and the presence of a groove along the outer (or dorsal) face of each of the tibiae, it differs from all other known species of *Rhytidonota*.

Length 11·0-12·0 mm., breadth (at middle of elytra) 4·0-4·2 mm.

Abd-el-Kuri.—Two examples taken (22. II. 99).

***Adelostoma*, Duponchel.**

6. *Adelostoma granti*, Gahan. (Plate xvii. fig. 4.)

Adelostoma granti, Gahan, Bull. Liverp. Muss., iii. p. 10 (1900).

Oblong-elliptical, depressed, black; the head in front arcuately emarginate, and furnished above with four small cariniform tubercles. Prothorax greatly and abruptly narrowed slightly in front of the base and furnished above with two longitudinal carinae. Both elytra are provided with three carinae, the inner carina widely interrupted towards the middle, and the intermediate one shortened posteriorly.

Length 6, breadth $2\frac{2}{3}$ mm.

Abd-el-Kuri (22. XII. 98).

[I met with only one example of this species.—*H.R.O.G.*]

CURCULIONIDÆ.

***Piazomias*, Schönherr.**

7. *Piazomias*, sp.

Abd-el-Kuri.

***Systates* Gerst. (?).**

8. (?) *Systates*, sp.

In addition to the species of *Piazomias*, a second species of this family was obtained belonging to *Systates* or some closely related genus.

Abd-el-Kuri.

EUMOLPIDÆ.

***Eryxia*, Baly.**

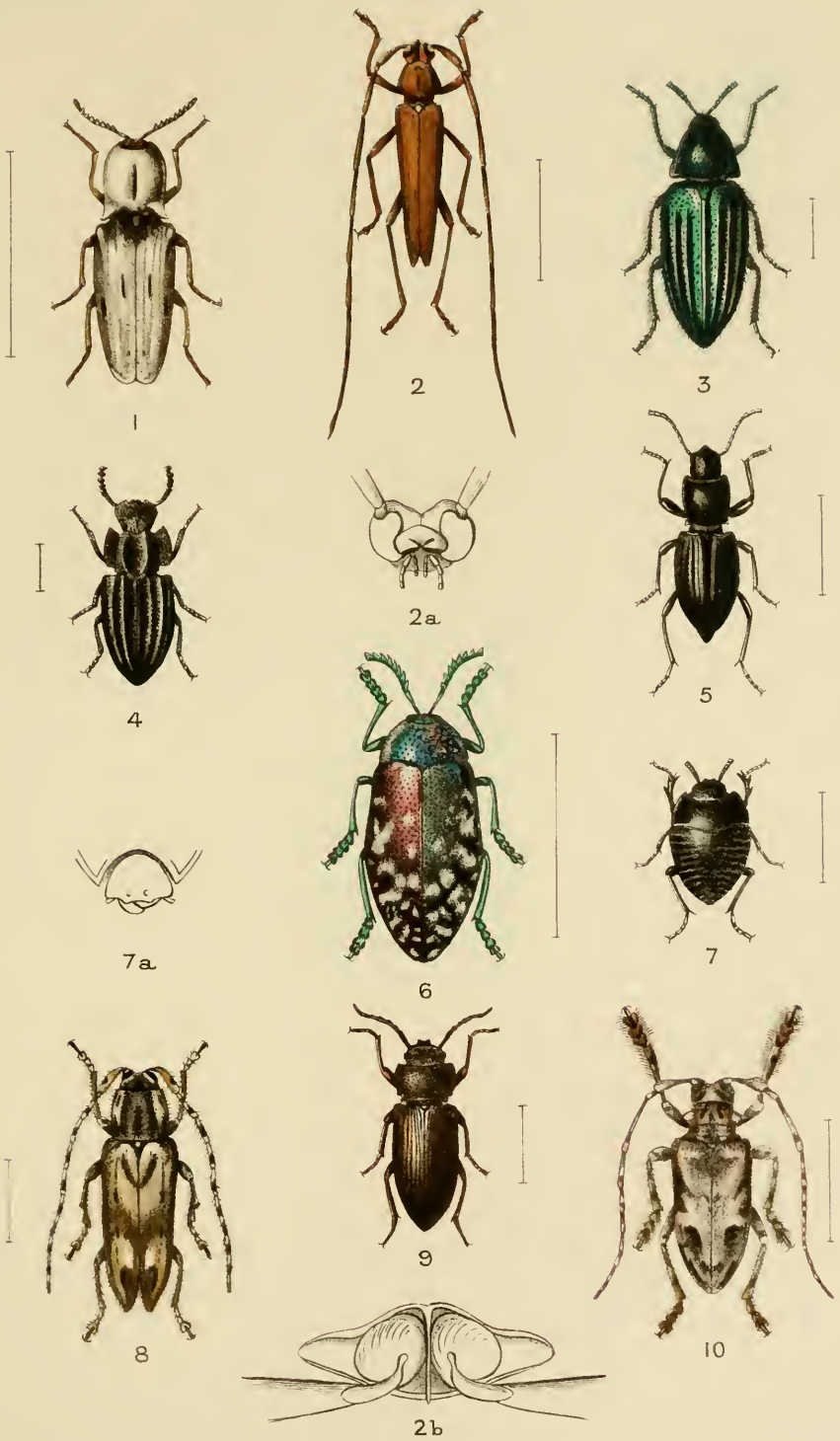
9. *Eryxia socotrana*, sp.n.

For description of this species see p. 287.

The examples of this species taken in the island of Abd-el-Kuri differ slightly from those found in Sokotra, inasmuch as they show no trace of the coppery tint present on the upperside in the latter.

PLATE XVII.

- Fig. 1. ALAUS SULCICOLLIS, *Gahan*, p. 270.
Fig. 2. ŒME FUSCA, *Gahan*, p. 284.
Fig. 3. MELYRIS INSULARIS, *Gahan*, p. 289.
Fig. 4. ADELOSTOMA GRANTI, *Gahan*, p. 291.
Fig. 5. EUSYNTELIA OPACICOLLIS, *Gahan*, p. 275.
Fig. 6. JULODIS CLOUEI, *Bug.*, p. 269.
Fig. 7. HISTEROMORPHUS UNDATUS, *Gahan*, p. 290.
Fig. 8. SYBRINUS COMMIXTUS, *Gahan*, p. 286.
Fig. 9. DERETUS DENTICOLLIS, *Gahan*, p. 281.
Fig. 10. IDACTUS GRANTI, *Gahan*, p. 285.



ARTHROPODA.

Insecta:

Lepidoptera.—I.

Rhopalocera.

By W. R. OGILVIE=GRANT.

PLATES XVIII., XIX

Butterflies.

The collection of Butterflies made by our Expedition raises the total number of species and varieties found in Sokotra to 28; of these 15 had already been recorded by Dr. Butler (P.Z.S., 1881, pp. 175-179 pl. xviii.), and Mr. Dixey (P.Z.S., 1898, pp. 372-382 pl. xxx.). The present list thus adds 13 species or varieties not previously recorded, and includes three species new to science, the most remarkable being a second species of *Charaxes* (*C. velox*). We also obtained the unknown males of *Charaxes bulfour* and *Belenois anomala*.

Ten species and one variety are peculiar to Sokotra, the remainder are all widely distributed species, belonging for the most part to Africa and Arabia.

The occurrence of the splendid North Indian species *Hypolimnas jacintha* is remarkable: it has probably been accidentally imported, and is certainly one of the rarest insects on the island.

On Abd-el-Kuri Butterflies were very poorly represented, only three very common and widely-distributed species being met with.

I.—The Butterflies of Sokotra.

RHOPALOCERA.

NYMPHALIDÆ.

LIMNAINÆ.

Limnas, Hübn.

1. *Limnas chrysippus*, Linn.

Papilio chrysippus, Linn., Mus. Ulr., p. 263 (1764).

Danaïs chrysippus, Butler, P.Z.S., 1881, p. 175.

Limnas chrysippus, Dixey, P.Z.S., 1898, p. 373.

On the Hadibu Plain and on the lower valleys on the north side of Sokotra we found this species fairly common but nowhere numerous. The wild Thyme covering the plain, in full flower in December, proved extremely attractive to insects of all kinds, and it was then that most of our examples were obtained. *Hypolimnas misippus* was also fairly

common there, and the females of the two species might easily be mistaken for one another at a short distance. The present species was never seen on the more elevated parts of the island. Mr. Bennett remarks that it was "seen only in the hills flying strongly." This statement does not agree with my observations, and it seems possible that he may have mistaken *Charaxes velox* for the present species.

2. *Limnas chrysippus*, var. *klugii*, Butl.

Limnas klugii, Butl., P.Z.S., 1885, p. 758.

3. *Limnas chrysippus*, var. *dorippus*, Klug.

Euploea dorippus, Klug., Symb. Phys., pl. xlviii. figs. 1-5 (1845).

These varieties were both obtained on the Hadibu Plain, but the latter form was only once seen, and apparently very scarce.

In describing a collection of Somaliland Lepidoptera in comparison with a series from Aden, Dr. Butler makes (P.Z.S., 1885, p. 758) the following interesting remarks in reference to the distribution of these two varieties (or species as he there reckons them):—"If my views of the relationship of this species [*Limnas dorippus*] to *L. chrysippus* and allies is correct, it will probably be found that typical *L. dorippus* does not range inland to any very great distance from the Somali coast, but that its place is occupied by its Indo-African representative. So far the two series before me fulfil my expectations; that received from Major Yerbury [from Aden] containing one male of each form, whereas that collected by Mr. Thrupp [in Somaliland] contains three pairs of the Indo-African form [*L. klugii*] and none of *L. dorippus*. Mr. E. Lort Phillips assures me, however, that three of the specimens were obtained within 80 miles inland from Berbera. . . . [*Limnas klugii*] is clearly the prevalent *Limnas* in Somaliland; *L. chrysippus* and *L. alcippus* having, apparently, entirely disappeared, *L. dorippus* being scarce and in all probability confined to the eastern coast. . . ."

SATYRINÆ.

***Mycalesis*, Hübn.**

4. *Mycalesis socotrana*, Butl.

Calysisme socotrana, Butler, P.Z.S., 1881, p. 175, pl. xviii. fig. 7.

Calysisme anynana, Dixey (nec Butl.), P.Z.S., 1898, p. 374.

The following is Dr. Butler's description of the Types:—

"Nearest to *C. anynana* from Johanna (Comoro group). Olive-brown; wings above with paler outer border traversed by a wavy submarginal brown line; a black marginal line; fringe slightly darker than the outer border: primaries crossed beyond the cell from costa to first median branch by a slightly undulated pale-bordered dusky line; two ocelli of the ordinary type, one towards apex about a quarter the size (*i.e.*, half the diameter) of the other, which is placed on the first median interspace: secondaries with a scarcely perceptible small blind ocellus on the first median interspace. Wings below paler, trans-

versely striated with darker lines, the disc (particularly in the female) suffused with lilacine grey, the ocelli with pale zones, and in the male, with whitish instead of orange irides, those of the primaries situated as on the upper surface, but the subapical one, particularly in the female, greatly reduced in size; the outer border with sharply defined zigzag inner edge towards apex, in the female suffused with ferruginous, the intersecting submarginal line being dark ferruginous; a broad central belt, the inner edge of which is obsolete in the male but sharply defined by a white-bordered ferruginous line in the female; the outer edge slightly undulated and angulated on all the wings, dark brown with pale border in the male, ferruginous with white border in the female; secondaries with seven discal ocelli, of which the second, third, and seventh are very small, and the fifth the largest. Expanse of wings, ♂ 1 inch 6 lines, ♀ 1 inch 9 lines."

This was perhaps the commonest butterfly in Sokotra, being almost equally numerous from sea level to an elevation of nearly 4500 feet. Wherever suitable bush cover occurs this species is plentiful. It is not met with in the more open country, being always found among the open bush jungle, or along the edges of the tiny grassy glades or dry beds of streams. Its flight is feeble and irregular like that of its allies, and from its bush-frequenting habits individuals are sometimes troublesome to net. We obtained both the 'wet' and 'dry' phases of this species, some examples having the ocelli on the under surface of the hinder wing largely developed, while in a few these markings were nearly obsolete. At Adho Dimellus, 3500 feet, our highest camp in the central Haghier range, it was particularly abundant, and numbers might be seen during the day time resting on the sugared posts put up for the capture of nocturnal Lepidoptera. It was a constant visitor to our breakfast table, spread in a shady recess overhung by bushes, often settling on the open pots of jam or tasting the chutnee. One peculiarity of this species is its unusual activity. It may be seen on the wing from early morning as soon as it is light till late in the evening after the sun has disappeared behind the hills, and even on dull, cloudy days, when other butterflies are seldom seen on the wing, it is constantly flitting about among the bushes.

NYMPHALINÆ.

Charaxes, *Ochs.*

5. Charaxes velox, *Grant.* (Plate xviii.).

Charaxes velox, Grant, Bull. Liverp. Muss., ii. p. 10 (1899).

Male:—Upper surface most like that of the male of *C. cowani*; under surface like that of the female of *C. antamboulou* but darker. General colour above of both wings dark chestnut. Primaries with the brownish-black submarginal band narrower, and broken up, between the extremity of the discoidal cell and the ornamental sub-marginal

row of chestnut spots, by two patches of chestnut relieved by brownish-black markings; the row of chestnut spots larger and with the margins much less sharply defined. Costal and median nervures pale green. Secondaries with the brownish-black marginal border much narrower, graduated, and terminating in a point above the first median nervule. The six spots ornamenting this border rounded and pale buff shading into pale cream on the two nearest the anal angle. Anal angle with a well-marked green patch shading into violet internally and ornamented by two rounded black dots, the same green colour strongly indicated between the 1st median and discoidal nervures by three patches. A rufous buff wedge-shaped mark arising about the middle of the costal and extending towards the apex of the discoidal cell. General colour of the under surface altogether darker and browner than in the female of *C. antamboulou*, from which it chiefly differs in the following points:—The darker basal part of the band across the disc of the primary extends to the first disco-cellular nervule; the submarginal spots next to the posterior angle are larger and blackish enclosing a lilac spot. On the secondaries the internal border of the spot at the anal angle, as well as of those along the hind margin, is greyish violet. Expanse, 3.05 inches.

Female :—Upper surface like that of the male, but the spots nearest the costal margin rather larger and more oblong; general colour of the under surface much greyer than that of the male, but with similar markings. Expanse, 3.35 inches.

Habitat. Sokotra, from nearly sea-level to an elevation of at least 4000 feet, where it becomes scarce.

This splendid new species was our most important addition to the list of the butterflies found in Sokotra. Considering how plentiful it is, and how widely distributed, it seems strange that it should have hitherto escaped capture, but no doubt this is due to its wariness, remarkably swift flight, and the difficult nature of the ground it generally frequents. The species was first met with on the 15th December, one or two examples being seen in a dry, rocky water-course on Gebel Raggit, one of the outer spurs of the Haghier range to the south of our camp on the Hadibu Plain. I failed to secure a specimen, but found a nearly full-grown larva (fig. 3) feeding on a sloe-like bush (*Dirichletia obovata*, Balf. fil) so common on the lower slopes of the hills. This larva pupated (fig. 4) on the 27th of December, and a male *Charaxes* hatched on the 8th of January. A second larva was afterwards found and preserved. This butterfly was met with in suitable localities from nearly sea-level to an elevation of at least 4500 feet, but its numbers gradually diminished as the higher ranges were reached. It was particularly numerous in the Adda Valley to the east of the Hadibu Plain, and in the neighbourhood of our camp at Jena-agahan, 1200 feet on the northern slopes of the Haghier range. Its favourite haunts are the steep, dry, boulder-strewn water-courses

overhung by bushes and trees. During the hottest part of the day it is very fond of sunning itself on the limb of some dead tree, or on the tip of an overhanging branch, sailing every few minutes to some fresh point. The flight is extraordinarily swift and strong, very different from that of its ally *C. balfouri*. The rough nature of the ground makes it generally impossible to follow it on the wing, and though one occasionally succeeds in netting one as it dashes past, by far the best mode of capture is to stalk them. As soon as the *Charaxes* settles, follow him up, stepping quickly and quietly from rock to rock, and when within striking distance a quick sweep of the long-handled kite net is generally successful. A pair of boots with very thick indiarubber soles will be found invaluable for such work, for in these one can move over the boulders without making a sound, and with little fear of falling, though it must be added that granite rocks soon play havoc with even the strongest soles.

On dull, cloudy days, or in the early morning and towards evening, this species may often be found at rest among the branches of the bush *Euphorbias*, and may then occasionally be boxed or taken with the finger and thumb. Many of our finest examples were secured in this way, for in the net the long swallow tails often get damaged before the butterfly can be got into the killing bottle.

On the limestone hills round Homhil, at the east end of Sokotra, this species was only rarely met with, while *C. balfouri* was comparatively common.

6. *Charaxes balfouri*, *Bull.* (Plate xix. figs. 1, 1a ♂.)

Charaxes balfouri, Butler, P.Z.S., 1881, p. 176, pl. xviii. fig. 6 (♀).

Dr. Butler's description of the Type is as follows:—

“*Female*:—Allied to *C. varanes*, from which it differs as follows:—The outer margins of all the wings dentated at the extremities of all the veins, that of the secondaries with two tails of the ordinary type, that at the end of the first median branch being rather short (3 to 4 millimetres), and that at the end of the third branch of about double the length, more slender and gradually tapering towards the point. Wings above deep mahogany red, rather paler on the basal half; primaries with all the markings as in *C. varanes*, excepting that the spots beyond the cell are not so black; secondaries with the rounded black spots only distinct towards the apex; outer border black with a marginal series of pale blue lunules fringed with snow-white. Body laky brown, prothorax and head olivaceous. Under surface of wings very like *C. varanes*, but the general colour greener, most like that of the darkest Natal specimens, the black characters on the basal area better marked, the white stripe limiting the broad basal area wider, more diffused externally, and distinctly angulated on all the wings; the ocelli on the secondaries slightly narrower, and the outer margin of these wings bordered with a series of large black and white lunules. Expanse of wings 3 inches 8 lines.

"The allied species *C. varanes* has hitherto been referred to the genus *Philognoma* on account of its only having one peculiarly shaped tail to the secondaries; but the arrival of this form from Sokotra necessitates its transfer to *Charaxes*, since we now possess a species with the structure of the latter genus, and the general character of the supposed *Philognoma*."

"*Male* :—Similar to the female, but smaller. Expanse of wings 2 inches 10 lines to 3 inches. One exceptionally large male taken at Adho Dimellus, in February, differs conspicuously from all others, in wanting the outer row of pale submarginal spots."

It was not until we reached the limestone ranges at Homhil, at the east end of Sokotra, that we met with this splendid butterfly. There, in a small rocky valley, traversed by a clear, rushing stream, overgrown with clumps of boxwood bushes and various other shrubs and trees, including fine examples of the Dragons-blood, we fell in with a brood, and secured some splendid examples of both sexes. A large bush, bearing small brownish nuts, appeared to be specially attractive, and some of these butterflies, mostly females, were generally to be found hovering round the lower branches, and it may therefore be presumed that this is one of the food plants.

This species, unlike *C. velox*, is comparatively easy to capture on the wing, the flight being neither so swift nor so strong. It was afterwards met with in the Adda Valley to the east of the Hadibu Plain, and subsequently at Adho Dimellus in the Haghier range up to an elevation of at least 4000 feet, but on the granite ranges it appeared to be decidedly rare. At Homhil, where it was fairly numerous, *C. velox* was but rarely seen. The *Charaxes*, like all the large strong-flying butterflies, very soon damage their wings, and examples in fine condition, with all four tails complete, are seldom to be caught. Many specimens of *C. balfouri* were so damaged that it would have been useless to kill them, and out of perhaps 50 netted, only half a dozen or so were perfect, and perhaps twice that number worth keeping. Only the female of this fine species was previously known, a somewhat worn example having been collected by Professor Bayley Balfour, in whose honour it was named.

Hypolimnas, Hübn.

7. Hypolimnas jacintha, Drury.

Papilio jacintha, Drury, Ill. Exot. Ent., ii. pl. xxi., figs. 1, 2 (1773).

Papilio avia, Fabr., Ent. Syst., iii. 1, p. 111 (1793).

The occurrence of this magnificent north Indian species in Sokotra was most unexpected. How it came there no one can tell, but it may have been accidentally introduced. It is certainly the rarest butterfly in the island, for during our three months' stay only eight were seen, and three secured. While at Dahamis our taxidermist, Mr. Cutmore,

reported having seen on the 21st December a very large dark butterfly with white latticed markings on the hind-wings, which was doubtless a female of this species : but though I carefully searched the neighbourhood, nothing more was seen of it. It was not until the 30th of December that I saw and caught the first specimen—a male in perfect condition. I shall never forget the excitement of that capture, for I fully believed that it would prove to be a new species. After a long tramp up to our new camping ground at Jena-agahan (1200 feet) on the northern slopes of the Haghier range, we were all enjoying a well-earned rest, when suddenly I beheld a magnificent butterfly sunning its wings on a granite rock close by, and a few seconds later the prize had been securely placed in the largest killing bottle. I caught two other specimens near this camp, a male and female, the former having the wings latticed with cream colour like those of the female. I also saw two more which I was unable to catch.

One female was seen at Homhil on 25th January by the Somali boy who accompanied me, and lastly a male was seen at Adho Dimellus (4500 feet) on the 15th of February.

It will thus be seen that the species was thinly distributed over the greater part of the island visited. The flight is remarkably powerful, and on the wing this insect looks very large, and more like a bird than a butterfly. At Jena-agahan, the only place where I personally saw the species, four out of the five seen were met with in the boulder-strewn bed of a dry watercourse. They loved to sun themselves among the granite rocks, where it was extremely difficult to catch them without tearing one's net to pieces.

8. *Hypolimnias misippus*, Linn.

Papilio misippus, Linn., Mus. Ulr., p. 264 (1764).

Hypolimnias misippus, Dixey, P.Z.S., 1898, p. 379.

This handsome and widely distributed species was met with on the lower grounds of Sokotra bordering the north coast, but I do not remember ever observing it at any of our higher camps.

It was most numerous, though not common, on the Thyme-covered Plain of Hadibu in the neighbourhood of our first camp on the Hanefu river, where the females were often mistaken at a short distance for *Limnas chrysippus*, Linn., which is fairly common on the same ground. All the females of this species were of the ordinary form, shewing no tendency towards the var. *alcippoides*, Butl.

A few examples were met with on the bush-clad Garieh Plain, below Jena-agahan, and in the Dimichiro Valley.

The flight of the male is very strong, and it is generally a troublesome butterfly to net. Mr. Bennett notes that he met with this species "chiefly in the hills," but my observations, recorded at the time, were exactly the reverse.

Pyrameis, Hübn.

9. *Pyrameis cardui*, Linn.

Papilio cardui, Linn., S.N., i. pl. ii. p. 774 (1767).

Pyrameis cardui, Butler, P.Z.S., 1881, p. 177; Dixey, P.Z.S., 1898, p. 379.

The Painted Lady was common on the low ground of Sokotra, the wild Thyme on the Hadibu Plain proving especially attractive.

Precis, H. bn.

10. *Precis clelia*, Cramer.

Papilio clelia, Cramer, Pap. Ex., i. pl. ii. E. F. (1775).

Junonia clelia, Dixey, P.Z.S., 1898, p. 379.

Mr. Bennett found this species "very common in the mountains" of Sokotra and collected six examples, two males and four females. Curiously enough, I never came across it, and it was the only butterfly previously known that was not procured.

On the other hand, we obtained twenty-three species of butterflies, seven of which were new to science or to the island, and among the latter were examples of *Precis cebrene* not met with by either Professor Bayley Balfour or Mr. Bennett.

11. *Precis cebrene*, Trimen.

Junonia cebrene, Trimen, Tr. Ent. Soc. Lond., 1870, p. 353.

This is another low ground butterfly, and we found it decidedly scarce; but as most of the specimens seen in the early part of December were faded and damaged, it is quite possible that earlier in the season the species may be commoner. Almost all the examples captured were taken on the Hadibu Plain in the neighbourhood of the Hanefu river. The favourite haunt of this species was a part of the plain covered with clumps of "bush grass" and stones on which it loved to settle and display its gorgeously coloured wings. It is a shy butterfly and troublesome to net, its flight being very strong, and, if once missed, it seldom affords a second chance.

Atella, Doubl

12. *Atella phalantha*, Drury.

Papilio phalantha, Drury, Ill. Ex. Ent., pl. xxi. fig. 1, 2 (1773).

A locally common species on the middle and higher slopes of the Haghier range from an elevation of about 1000 to 3000 feet. We first met with two examples of this handsome butterfly on Moukaradia (600 feet) hovering over some flowering bushes on the sides of a dry torrent bed, and subsequently found it fairly numerous above Dahamis (1600 feet), on the 21st of December, on one of the small open plateaux covered with spear grass, where numbers were hovering round a large sort of tree-ivy. A few were seen about our camp

at Jena-aghan, and many on a plateau on the pass below Adho Dimellus (3000 feet, 18th of February). The flight is much like that of the Fritillary, which it resembles in outward appearance, and, generally speaking, it is an easy butterfly to net.

Byblia, Hübn.

13. *Byblia boydi*, Dixey.

Hypanis cora, Butler (nec Feisth.), P.Z.S., 1881, p. 177, pl. xviii. fig. 4.

Byblia boydi, Dixey, P.Z.S., 1898, p. 375, pl. xxx. figs. 1 ♂ and 2 ♀.

Mr. Dixey has described the Types as follows :—

“Distinguishable from the ‘dry season’ form of *B. götzius* Herbst., and *B. auratara*, Boisd., by the following particulars :—(1) The area of fulvous ground colour lying between the black submarginal band and the oblique median black patch on the disc of the fore-wing is in *B. boyli* divisible into two portions, separated by a pair of black denticulations, which almost meet one another along the course of the first median branch. Of these two portions, the posterior is conspicuously narrower than the anterior, the narrowing being caused mainly by the encroachment outwards of the oblique median patch. The outline of this latter patch in the allied forms tends rather sharply inwards between the first median branch and the dorsal border, but in *B. boyli* it is continued to the dorsal border at such an angle as to preclude the fulvous area from expanding again posteriorly, as it does in normal *B. götzius*. (2) A chain of small black spots is more or less visible, crossing the fulvous median area of the hind-wing upperside. These spots, which correspond to a series constantly present in *B. ilithyia*, Drury, are only rarely indicated in *B. götzius*. The above characters appear to be constant and distinctive. One or more of the following features may be found in specimens of *B. götzius* from various localities on the mainland, but they do not occur all together except in *B. boyli*, where the combination appears to be constant :—(1) The black costal bar of the fore-wing is continued across the wing to meet the submarginal black band. (2) The fulvous submarginal spots of the hind-wing upperside are large, subconical, and only slightly separated by the black-coloured veins. (3) All the black markings of the upperside are highly developed, especially the submarginal band of the hind-wing, which encroaches considerably inwards. In the presence of the chain of small median dark spots, and in the large size of the fulvous submarginal spots of the hind-wing, *B. boyli* approaches *B. ilithyia*; in other respects it is much nearer *B. götzius*. The combination of characters above given renders the Sokotran form easily recognizable among its allies, and seems to justify its separation as distinct.”

This is one of the commonest butterflies in Sokotra, and universally distributed from the lower slopes of the hills to an elevation of at least 4000 feet. Though I never saw it on the wing on the Hadibu

Plain, it must occasionally occur there, for I found the remains of one which had evidently been eaten by some bird close to our first camp. It was perhaps most numerous on the higher ground, being especially abundant round Adho Dimellus. There it was to be found in all the glades and openings among the bushes, and splendid freshly hatched examples were constantly to be met with. It is difficult to imagine a more pleasing contrast in colour than the rich chestnut and black wings of this butterfly resting on the clusters of pale lilac blue flowers of the Gentians (*Exacum affine*). We noted nothing very peculiar in its habits; the flight is not very rapid, and it is easily caught.

Out of a very large number of perfect specimens taken, many of which were preserved, hardly any variety of marking was observed, all being wonderfully alike, and it may therefore be presumed that the characters of this insular species are constant.

ACRÆINÆ.

Acræa, Fabr.

14. *Acræa neobule*, Doubl.

Acræa neobule, Doubl., Hew. Gen. D. L., pl. xix. fig. 3 (1848).

Acræa neobule, Butler, P.Z.S., 1881, p. 177, pl. xviii. fig. 5; Dixey, P.Z.S., 1898, p. 374.

This lovely butterfly, first met on the lower bush-clad slopes of the Haghier range, was found in gradually increasing numbers up to an elevation of at least 4500 feet. It was equally abundant on the limestone range round Hombil at the east end of Socotra. On the higher grassy slopes round Adho Dimellus (3500 ft.) it positively swarmed in places, and was to be seen in all directions resting on the tall grass stems, slowly moving its wings in the brilliant sunshine and looking like some lovely flower. There can be little doubt that the brilliant scarlet of the wings fades after death. Possibly this may be due to the damping process which is unavoidable when butterflies have to be relaxed before they are set. Most of the specimens were in such splendid condition that even after a good series of perfect examples had been captured we found it difficult to refrain from taking just one more.

Though not swift the flight of this insect is very beautiful; after a few beats of the wings it sails gracefully along over the tops of the bushes for a considerable distance, hovering here and there or resting for a few moments on the flowering shrubs and plants. Though easily caught it is very tenacious of life, and we frequently found it come to life again after a sojourn in the killing bottle calculated to kill any ordinary butterfly. The males are apparently very much more numerous than the females.

LYCÆNIDÆ.

Tarucus, Moore.**15. *Tarucus socotranus*, Grant.** (Plate xix. figs. 2, 2a, 2b).

Tarucus socotranus, Grant, Bull. Liverp. Muss., ii. p. 10 (1899).

Male:—Most nearly resembles the male of *T. plinius*, var. *pulchra*, the upper surface being practically alike in both, but on the under surface the pattern is quite different. The sub-marginal bands across the discal area of the primaries are continuous and run parallel to the margin. On the hinder wings, this peculiarity is even more marked, the second sub-marginal band being unusually wide and interrupted, while the dusky band within is ornamented in the middle by a clearly defined long oval spot of blackish girdled with white. Expanse 1.2 inch.

Female:—Much like the female of *T. telicanus*, but with the general colour of the upper surface darker sooty brown and more uniform, the lighter pattern above being inconspicuous; the black spot between the first and second median nervules oblong and margined above and below with white bands; the under surface like that of the male.

Habitat. Sokotra.

We met with this handsome Blue both on the plains and on the higher slopes of the hills. It was perhaps most numerous in the pass below Adho Dimellus, at an elevation of about 3000 feet. It is a bush-frequenting species, and was invariably to be seen flying round the larger flowering shrubs or at rest on the leaves.

16. *Tarucus quadratus*, Grant. (Plate xix. figs. 3, 3a, 3b).

Tarucus theophrastus, Dixey (*nee Fabr.*), P.Z.S., 1898, p. 380.

Tarucus quadratus, Grant, Bull. Liverp. Muss., ii. p. 10 (1899).

Male:—Most nearly allied to the South African form of *T. theophrastus*, the upper surface being very similar, but the black sub-marginal markings on the secondaries are reduced to two well-defined spots, one situated at the anal angle, and the other between the first and second median nervules. The under surface of the primaries differs conspicuously in having a large sub-quadrate black patch situated between the costal band and the black band crossing the middle of the wing; the patch commences about the middle of the sub-median nervule and extends to the anterior angle of the discoidal cell. Expanse 0.9 inch.

Female:—Most like the female of the South African form of *T. theophrastus*, but the row of spots along the hind margin of the secondaries is more widely edged with white; under surface like that of the male. Expanse, 0.75 inch.

Habitat. Sokotra.

This beautiful little butterfly, which we knew as the "Zebra-blue" on account of the markings on its under surface, was first seen among the young date-palm groves on the banks of the Hanefu river, and subsequently met with in the Adda Valley and Goahal Gorge at elevations

not exceeding 500 feet above sea level. It was not seen at any of our higher camps, and is apparently confined to the low ground. Like *T. socotranus* it is a bush-frequenting species, and spends most of its time hovering round the smaller trees and flowering shrubs. Though nowhere very common, it was fairly plentiful in the Goahal Valley below Homhil, and in the Adda Valley to the east of the Hadibu Plain.

Cacyreus, *Butl.*

7. Cacyreus lineus, *Cramer.*

Papilio lineus, Cramer, Pap. Ex. iv., pl. cccclxxix. F. G. (1782).

This species was met with on the plains and on the lower and middle slopes of the Haghier range up to an elevation of about 3500 feet. The habits are very similar to those of the two species of *Tarucus* previously mentioned.

Chilades, *Moore.*

8. Chilades trochilus, *Freyer.*

Lyceena trochilus, Freyer, Neuere Beitr., v. pl. 440 fig. 1 (1844).

This lovely little Argus Blue was only found in the Goahal Gorge below Homhil.

Zizera, *Moore.*

9. Zizera knysna, *Trimen.*

Lyceena knysna, Trimén, Trans. Ent. Soc. Lond. (3), i. p. 282 (1862).

Zizera lysimon, Dixey, P.Z.S., 1898, p. 380.

Very abundant everywhere from sea-level to an elevation of at least 4000 feet. Unlike the other Blues mentioned above, this little butterfly is essentially a *ground species*, preferring the stony plains, mountain paths, and similar open spots, where it is always in evidence either sunning its wings on the ground or darting about at a great pace in pursuit of its fellows.

As it is always rather a troublesome matter to obtain perfect specimens of *Lyceenidae*, I should like to draw the attention of field collectors to the following points. All the Blues when placed in a killing bottle have a most perverse habit of dying with the upper surface of their wings exposed. If attended to at once, with the aid of a fine-pointed pair of forceps, which should always be carried, the wings can be easily reversed, but if left a minute too long, rigor mortis sets in and it is then impossible to move them. It is of course essential to leave all specimens in the fumes of the cyanide until they are quite dead, so, after attending to the wings, they should be replaced in the killing bottle, for, however carefully the latter may be carried, the exposed surface of the wings is sure to become more or less rubbed before the butterfly can be safely transferred to the zinc pocket box. If placed in paper envelopes with the upper surface of the wings outermost

butterflies not only get rubbed, but are very much more difficult to pin and set when relaxed. These remarks of course do not refer to such specimens as may be collected to show the under surface.

PAPILIONIDÆ.

PIERINÆ.

Teracolus, Swains.

20. *Teracolus niveus*, *Butl.*

Teracolus niveus, Butler, P.Z.S., 1881, p. 177, pl. xviii. fig. 1; Dixey, P.Z.S., 1898, p. 380.

The Types have been described by Dr. Butler as follows :—

“ ♂ Nearest to *T. eugore*, *demagore*, and *liagore*, but differing from all in the considerably smaller extent of the orange apical patch on the primaries. Wings above, snow-white; primaries above with a narrow triangular, orange, apical patch from costa to third median branch, bounded externally by five hastate black spots, and in front by an abbreviated black costal line: body black, thorax clothed with silvery hairs, abdomen cream-coloured at the sides. Under surface white, each wing with a small black dot at the end of the cell, primaries indistinctly showing the orange of the upper surface through their texture; secondaries with a greyish costal spot, and one or two dots of the same colour on the disc beyond the cell, basi-abdominal area slightly speckled with black. Expanse of wings 1 inch 5 lines.

“ ♀ Snow-white, base speckled with blackish: primaries above with a dot at the end of the cell, four spots in an oblique series, more than half-way between the cell and apex, and four or five squamose marginal spots between the apex and the third median branch, black: secondaries with four decreasing marginal black spots between the apex and the second median branch: body blackish, clothed with white hairs, but rather paler than in the male. Primaries below white, a black dot at the end of the cell: four brownish spots in an oblique series, limiting the inner edge of the apical area, which is cream-coloured and speckled with grey: secondaries cream-coloured speckled with grey; a black dot at the end of the cell: an angulated series of seven more or less distinct brownish spots across the disc: body snow-white. Expanse of wings 1 inch 4 lines.”

The Larger Orange-tip was very common on the lower and middle slopes of the Haghier range and at Homhil up to an elevation of about 2000 feet. It frequents the thin jungle and small open spaces along the sides of mountain torrents, and is constantly to be seen flitting along close to the ground, threading its way among the stems of the bushes. The flight, though much stronger than that of the smaller form *T. candidus*, is decidedly slow, and there is never much difficulty in securing any particular individual.

The large series of specimens collected shows considerable variation both in size and markings. Some males have the orange patch at the tip

of the fore-wing, pale in colour and much reduced in size ; while in others it is large and shaded internally with vermilion. The black markings in the females vary greatly in intensity. Towards the end of January most of the examples seen were very worn, and during our return to the coast in the middle of February hardly any were met with.

21. *Teracolus niveus*, var. *candidus*, *Butl.*

Teracolus candidus, Butler, P.Z.S., 1881, p. 178, pl. xviii. fig. 2.

The following is the description of the Types :—

“♂ Allied to the preceding, but smaller ; the primaries with an oblique subapical orange patch, five pyriform marginal black spots ; secondaries with two apical marginal black dots : below much as in *T. niveus*. Expanse of wings 1 inch 2 lines.”

“♀ Chiefly differs from the preceding in its smaller size and less pronounced markings. Expanse of wings 1 inch 2 lines.”

The Smaller Orange-tip, though less plentiful than the larger form, was met with in the same localities, and readily distinguished on the wing by its much smaller size and feeble flight. The very small examples which form the bulk of the specimens collected look so very different from typical *T. niveus*, whether male or female, that one is at first disposed to believe they must belong to distinct species ; but in the large series collected smaller examples of the latter so closely approach larger individuals of *T. candidus* that it appears to be impossible to separate the two forms specifically. I think it is a mistake to suppose that *T. niveus* is the wet season and *T. candidus* the dry season form of the same species, for both were plentiful on the wing in December and January, and had almost disappeared by the middle of February.

Catopsilia, Hübn.

22. *Catopsilia florella*, *Fabr.*

Papilio florella, Fabr., Syst. Ent., p. 479 (1775).

Catopsilia pyrene, Butler, P.Z.S., 1881, p. 178.

Catopsilia florella, Dixey, P.Z.S., 1898, p. 381.

This species was especially common on the Hadibu Plain in December, when hundreds might be seen on the wing flying in every direction, or hovering over the sweet-scented wild Thyme then in full bloom. It is essentially a butterfly of the plains, but was occasionally met with up in the Haghier range on the open grass plots.

23. *Catopsilia florella*, var. *aleurona*, *Butl.*

Catopsilia aleurona, Butler, Ann. and Mag. N.H. (4), xviii. p. 489 (1876).

24. *Catopsilia florella*, var. *pyrene*, *Swains.*

Cotias pyrene, Swains, Zool. Ill., i. pl. li. (1820-21).

Besides the typical form these two varieties were obtained on Sokotra.

Both were rare, and only seen on one or two occasions.

Belenois, Hübn.**25. *Belenois anomala*, Bull.** (Plate xix. fig. 4, ♂.)*Synchlōë anomala*, Butler, P.Z.S., 1881, p. 178, pl. xviii. fig. 3 (♀).*Belenois anomala*, Dixey, P.Z.S., 1898, p. 380.

Dr. Butler gives the following description of the Type:—

“*Female*:—Most like *Synchlōë protodice* of North America, but larger than any species of the group. Wings above white, speckled with black scales at the base; primaries with the costal border to the end of the cell heavily black-speckled; a large subquadrate black spot on the discocellulars; a very irregular black discal band formed of large oblong spots alternating with lunules, only separated from a rather broad external border by a series of six unequal white spots: this border is broad at apex, and gradually tapers to the external angle; secondaries with angular submarginal series of five black spots (the first on costal border large and quadrate), separated from a tapering brown border by spots of the ground colour, as in the primaries; body above blackish, clothed with silky grey hairs; prothorax clothed in front with short brown hair; palpi white, with brown edges; antennæ pale brown. Under surface white, broadly but sparsely speckled with black scales towards the base; primaries with the discocellular spot, discal band, and dusky basal half of costa as above; outer border obsolete, this part of the wing being, however, apparently greyish owing to its semi-transparency, and slightly shot with pink: secondaries with slight pink reflections; the markings of the upper surface only indistinctly visible through the texture of the wing; body below white. Expanse of wings 2 inches 6 lines.” Some of the females we obtained measure 2 inches 9 lines.

Male:—Most nearly resembles the female, but the general colour of the wings is *white*, and the black markings are fewer and reduced in size. The irregular black discal band on the primaries is broken, the alternating lunules being but faintly indicated or absent. On the secondaries the submarginal series of black spots is reduced to three. The first and second are well marked and situated as in the female, but the third is placed between the 2nd and 3rd nervules and indistinct. The under surface is similar to that of the female.

Expanse of wings 2 inches 8 lines.

We found this handsome white butterfly thinly distributed from the lower granite slopes of the Haghier range up to an elevation of about 4000 feet, and on the limestone ranges about Homhil. It is one of the most difficult of all the Sokotran butterflies to catch, for it rarely approaches the ground, and generally travels along at a great pace over the tops of the bushes and trees, fifteen or twenty feet from the ground and sometimes much higher. It rarely seems to settle, and then only for a few moments on some inaccessible flower.

Though a fair number may be seen daily on suitable ground, it is only now and then that an odd specimen can be secured. Individuals may

occasionally be found settled on a flower within easy reach, but this is quite exceptional, and, as a rule, the nature of the ground renders pursuit impossible. Being anxious to obtain a full series of this butterfly, I found it necessary to pay special attention to its habits, and by doing so eventually secured a number of perfect examples of both sexes. By watching closely it soon became evident that most of the individuals seen followed much the same line of flight across the tops of the trees, and that every now and then this track descended from the higher branches and passed over the lower bushes, where it was just possible to net them. By taking up a suitable position in the line of flight, and waiting patiently, it was possible to secure several in a morning, and on one occasion I managed to net as many as five perfect specimens in an hour. Many of the males were in such poor condition that they were not worth keeping, and no doubt in the course of their strong restless flight the wings soon become damaged. On several occasions I was fortunate enough to meet with pairs, but though the females were perfect, the males were nearly always more or less worn.

The species was first described from a very worn and ragged female specimen brought home by Professor Bayley Balfour in 1881: subsequently a second example of the same sex was collected by Mr. Bennett. The male figured in the accompanying plate was not previously known.

Papilio, Linn.

26. *Papilio bennetti*, Dixey.

Papilio bennetti, Dixey, P.Z.S., 1898, p. 381, pl. xxx. fig. 3.

Mr. Dixey describes the Types of the species as follows:—

“Two specimens, both probably ♂, but the abdomen of one is imperfect.

These resemble *P. demoleus*, Linn., from the African mainland, but may be distinguished by the following characters:—(1) On the upper surface all the yellow markings are much reduced in size, and the second spot from the dorsal border of the yellow median chain in the fore-wing is more or less Z-shaped, instead of being irregularly rhombic as in *P. demoleus*. (2) There is a broad black area of almost uniform width between the median and the submarginal chains of yellow spots on the fore-wing. The corresponding area in *P. demoleus* is comparatively narrow, and conspicuously denticulated in consequence of the relatively large size of the median yellow spots. (3) On the under surface the pale submarginal spots of the hind-wing are quadrate, or even elongated in a direction at right angles to the border of the wing: whereas in *P. demoleus* they tend to be oblong, with the long diameter parallel to the hind border. The same applies to the series of rudimentary eye-like marks immediately proximal to the yellow submarginal row. Another feature which is probably distinctive is the fact that in the eye-like mark within the cell on underside

of the hind wing the blue edging with its accompanying buff crescent extends only along the posterior side of the triangular black patch, instead of being continued along two sides, the posterior and the dorsal, as in *P. demoleus*. An approach to this condition may occasionally be seen in the latter species. Many specimens of *P. demoleus* from Aden resemble *P. bennetti* in the narrowness of the pale median band of the hind-wing; they differ, however, in the other particulars."

The Type is in the Hope Museum at Oxford.

It was not until we reached our highest camp at Adho Dimellus (3500 ft.) in the Haghier range, that we met with this fine butterfly. It was first discovered by Mr. Bennett, whose name it bears, near the summit of Gebel Dryat, a huge granite peak, the highest in Sokotra, rising some miles to the east of our camp. During the first few days of our stay none were observed, but on the 3rd of February I saw one flying at a great pace along the bush-clad hillside near our camp, and Dr. Forbes reported that he had seen two more, so it was evident that the species had begun to make its appearance. On the 6th of February, accompanied by Jama, our excellent Somali butler, I made a special expedition to the top of a high point in the neighbourhood, and on reaching the summit found two fine *Papilio* on the wing. Their flight was very strong and rapid, and so far as I saw they never settled during the hours we watched them, but continued their mad career up and down the bare granite cliffs, every now and then descending to take a turn over the thick bush surrounding the base. Like many other butterflies, they seemed to have particular lines of flight, so after watching their manœuvres we posted ourselves on suitable ledges. But luck was against us, and during three hours patient waiting in the broiling sun we never once got so much as a chance of netting one. One hates being beaten, and as a last resource I determined to try shooting one. Taking most of the No. 12 shot out of a light cartridge for the collecting gun, I waited my chance and made a good shot at one as it crossed the bushes. The result, though apparently satisfactory, proved disastrous, for almost the whole charge had gone through the wings, and the splendid insect was utterly ruined. Subsequently, however, I was more successful, and with the aid of two of our Somalis, we gradually made up a fair series, a good many being in perfect condition. A large number were seen on the highest ground on the 18th of February, and had we been able to remain a few days longer, many would certainly have been added to the collection, but as it was we got sufficient. It is essentially a butterfly of the granite peaks, and the few captured lower down about our camp at Adho Dimellus were all males and evidently stragglers in search of a mate. This is a difficult butterfly to follow with the eye, the flight being very rapid while the mottled yellow and black markings of its quickly beating wings produce an indefinite colour hard to distinguish from the surrounding objects at any great distance.

HESPERIIDÆ.**Gegenes, Hübn.****27. *Gegenes occulta*, Trimen.***Pamphila occulta*, Trimen, P.Z.S., 1891, p. 103.*Gegenes nostradamus*, Dixey, P.Z.S., 1898, p. 382.

This small, widely distributed Skipper was far from common in Sokotra, and most of the specimens captured were in more or less worn condition. I first met with a single example on 17th of December in the bed of the Hanefu river close to our camp at Hadibu, and subsequently captured several, both in the Goahal Gorge (1200 ft.) below Homhil, and at Adho Dimellus (3500 ft.), the highest pass in the Haghier range. It was also met with at one or two other places, always singly. It appears to lead a somewhat solitary existence, frequenting the dry rocky paths, where it may occasionally be seen bustling along at a great pace, or resting to sun its wings on the ground. The flight, though very rapid, is seldom long sustained, and, as it constantly settles, it may be easily captured if carefully approached.

Rhopalocampta, Wallengr.**28. *Rhopalocampta jucunda*, Butl.** (Plate xix. figs. 5, 5a, 5b, 5c.)*Hesperia jucunda*, Butler, P.Z.S., 1881, p. 179, pl. xviii. fig. 8.*Rhopalocampta jucunda*, Dixey, P.Z.S., 1898, p. 382.

Dr. Butler's description of the Type is as follows :—

“Dull blackish brown : primaries shot with shining green and bronzy brown towards the base ; edge of costal margin yellow towards the base, but white towards the apex : fringe of outer margin snow-white : secondaries with costal border and anal angle velvety black ; the hairy clothing of the basal area greenish-grey, of the abdominal fold pale testaceous ; a patch of ochreous hair just above the anal angle ; fringe with an ochreous basal line, externally snow-white to the first median branch, where it changes to bright reddish-orange : head and thorax very dark green ; the palpi (excepting their terminal joint and external margin, which are velvety black), a spot at the base of each antenna, and the back of the head bright reddish-orange ; abdomen dull black, with greyish hind margins to the segments, anus surrounded by reddish-orange hairs. Wings below greyish-brown : primaries with a large diffused purplish-black basal patch ; costal margin orange towards the base, but afterwards white ; an abbreviated line on the submedian vein, a second on the inner margin, and the fringe white : secondaries with the fringe as above ; a triangular spot within the end of the cell, a large elongated patch enclosing a black spot on the interno-median interspace, and an interrupted squamose streak running upwards towards the apex from its external extremity orange ; a circular spot near the outer margin on the interno-median interspace, and a second at anal angle confluent with the fringe, reddish-orange ;

pectus blackish ; femora and tibiae streaked with pale buff and clothed with long reddish-orange hairs, venter black at the sides, with two or three small orange dots ; a broad central longitudinal reddish-orange stripe. Expanse of wings ♂ 2 inches 6 lines, ♀ 2 inches 9 lines.

. . . The species comes nearest to *H. taranis*."

This handsome Skipper, first discovered by Professor Bayley Balfour, is one of the most abundant butterflies in Sokotra, and is met with from sea-level to an elevation of at least 4000 feet, where the bush ceases. Though a few were seen from time to time crossing the Hadibu Plain at a great pace, these were merely stragglers from the hosts that frequent the thick bush that covers the sides of the hills. Here they are constantly to be seen on the wing, moving with heavy flight and quickly vibrating wings among the foliage, or hovering over the flowering shrubs and looking more like great dark moths than butterflies. So far as I observed, and I must have seen thousands, they never settle on the ground, but always on the stems of the bushes, where they may constantly be seen resting with closed wings, showing the handsome orange yellow pattern on the under surface. Among the bush they are very easy to catch, being in no way shy, and one has only to wait for a favourable opportunity, which soon presents itself. We found large numbers of the extremely handsome larva (fig. 5a) of this skipper feeding on a shrubby species of *Ficus*, and a number pupated in a breeding cage. The caterpillar spins one or two of the leaves together and forms a shelter, within which the chrysalis (fig. 5c) is suspended. The latter is at first of a beautiful pink colour, inclining to crimson in places, but soon changes to dull yellowish white. The larvæ of this skipper remains in the pupa stage for about thirty-four days, for the first which spun up about the 20th of January did not hatch till the 23rd of February, the day we left Sokotra and went on board the 'Elphinstone.' Besides about fifteen pupa and some larvæ of this skipper, I took on board numerous chrysalides of other species, including some large hawk moths, probably of the sharp winged species already met with. These came to an untimely end, being all destroyed by thousands of tiny red "ship ants" in a single night. Not one escaped. It was a most unfortunate ending to our otherwise successful expedition, and meant the loss of much time and trouble.

II.—The Butterflies of Abd-el-Kuri.

NYMPHALIDÆ.

LIMNAINÆ.

Limnas, Hübn.

1. *Limnas chrysippus*, Linn.

See page 295.

Several examples of this form were captured on Abd-el-Kuri.

NYMPHALINÆ.

Pyrameis, Hübn.

2. *Pyrameis cardui*, Linn.

See page 302.

The Painted Lady was common on the northern slopes of the high mountain overlooking our anchorage at Bandar Saleh.

PAPILIONIDÆ.

PIERINÆ.

Catopsilia, Hübn.

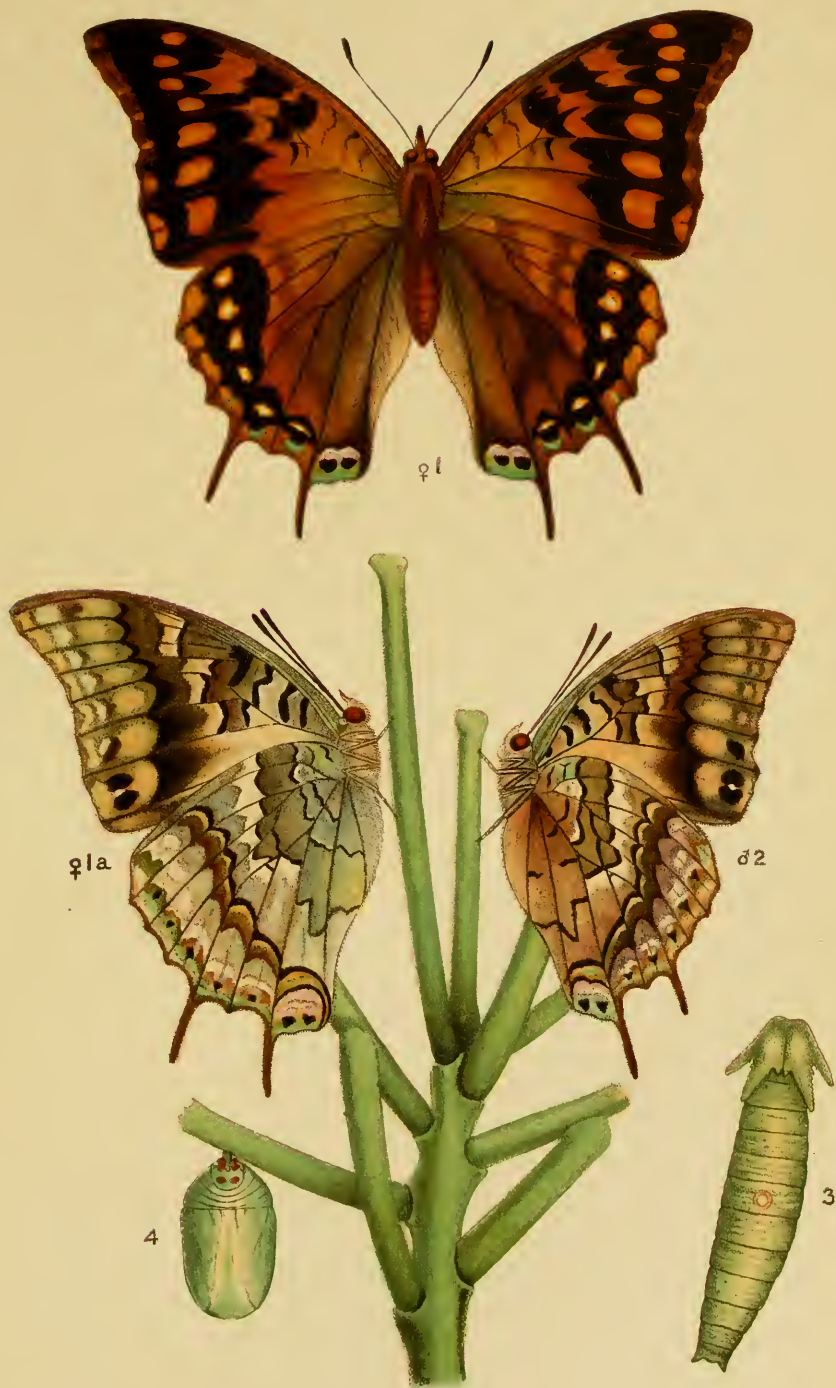
3. *Catopsilia florella*, Fabr.

See page 308.

One or two specimens of this species were taken during our first visit to this island in the beginning of December, 1898, and were then in poor condition.

PLATE XVIII.

CHARAXES VELOX., *Grant*, p. 297.Fig. 1. *Female, upper side.*Fig. 1a. *Female, under side.*Fig. 2. *Male, under side.*Fig. 3. *Full grown larva.*Fig. 4. *Pupa.*



M.Horman-Fisher lith

West, Newman chromo

PLATE XIX.

- Fig. 1.** **CHARAXES BALFOURI**, *Butl.*, ♂, upper surface, p. 299.
Fig. 1a. *The same, under surface.*
- Fig. 2.** **TARUCUS SOCOTRANUS**, *Grant*, ♂, upper surface, p. 305.
Fig. 2a. *The same, under surface.*
Fig. 2b. *The same. ♀, upper surface.*
- Fig. 3.** **TARUCUS QUADRATUS**, *Grant*, ♂, upper surface, p. 305.
Fig. 3a. *The same, under surface.*
Fig. 3b. *The same, ♀, upper surface.*
- Fig. 4.** **BELENOIS ANOMALA**, *Butl.*, ♂, upper surface, p. 309.
- Fig. 5.** **RHOPALOCAMPTA JUCUNDA**, *Butl.*, under surface, p. 312.
Fig. 5a. *Larva of same.*
Fig. 5b. *Front view of head of larva of same.*
Fig. 5c. *Pupa of same.*



M. Hornan-Fisher lith

West, Newman ch

ARTHROPODA.

Insecta:

Lepidoptera.—II.

Phalænæ.

By Sir G. F. HAMPSON, Bart., B.A., F.E.S.

PLATE XX.

Moths.—I.

The species of Moths taken in Sokotra and Abd-el-Kuri by Messrs. Forbes and Grant as given in the following list are all typical of the fauna of the more arid districts of E. Africa, Somaliland, Arabia, Persia, and W. India, and not a single species was taken, the affinities of which are other than might be expected.

The species collected in the former island by Mr. Bennett, of which a list was published in the P.Z.S. for 1898, p. 383, by Professor Dixey, were in such bad condition that only approximate identifications were possible, any corrections necessary will be found below.

I.—The Moths of Sokotra.

LEPIDOPTERA PHALÆNÆ.

ARCTIADÆ.

NOLINÆ.

Celama, *Wlk.*

1. *Celama pumila*, *Snell.*

Nola pumila, Tijd. v. Ent. xvii. p. 68, pl. 6 fig. 4 (1874).

Sokotra: Adho Dimellus (3500 ft.), 10 ♀; Jena-agahan (1200 ft.), 1 ♂;

Hadibu Plain, 1 ♀.

[Taken at light.—*W.R.O.G.*]

LITHOSIANÆ.

Ilema, *Hübner*.

2. *Ilema sokotrensis*, *Hmps.*

Ilema sokotrensis, Hmps., Cat. Lep. Phal. B. M., ii. p. 166, pl. 22 fig. 26.

Lithosia vetusta, Dixey, P.Z.S., 1898, p. 383 (*nec* Wlk.).

Sokotra: Adho Dimellus (3500 ft.), 3 ♀; Homhil (2500 ft.), 1 ♀

[Taken at light.—*W.R.O.G.*]

ARCTIANÆ.

Utetheisa, *Hübner*.3. *Utetheisa pulchella*, *Linn.**Tinea pulchella*, Linn., Syst. Nat. 1, ii. p. 884.*Deiopeia pulchella*, Butler, P.Z.S., 1881, p. 179.

Sokotra: Adho Dimellus (3500 ft.), 1 ♂, 3 ♀; Jena-agahan 4 ♂, 1 ♀;
 Homhil (1500 ft.), 1 ♂, 1 ♀; Hadibu Plain, 1 ♂.

[Very common among the open patches of spear grass from sea-level to an
 elevation of at least 4000 feet.—*W.R.O.G.*]

NOCTUIDÆ.

CARADRININÆ.

Agrotis, *Ochs.*4. *Agrotis segetis*, *Schiff.**Noctua segetis*, Schiff, Wien Verz. p. 252.

Sokotra: Adho Dimellus (3500 ft.), 3 ♂, 2 ♀.

[Taken at sugar.—*W.R.O.G.*]

5. *Agrotis brachypecten*, *Hmps.* (Plate xx. fig. 1.)*Agrotis brachypecten*, Hmps., Bull. Liverp. Muss., ii. 2, p. 35 (1899).*Agrotis dirisa*, Dixey, P.Z.S., 1898, p. 383 (*nec* Wlk.).

♂ Antennæ bipectinate, the branches very short with fasciculate cilia; reddish brown, mixed with grey; palpi fuscous at sides; tegulæ with blackish lines; patagia with blackish streak; abdomen paler, dorsally tinged with fuscous towards base. Fore-wing with subbasal and ante-medial greyish lines defined by fuscous, the former short waved, the latter waved, produced to a rather long angle above inner margin, and with the short blackish claviform stigma on its outer edge; the orbicular greyish defined by fuscous, and either circular or rather elongate and pointed at the ends; the reniform large with fuscous centre and outline, or entirely suffused with fuscous, and with fuscous suffusion above it on costa; the postmedial line excurved from below costa to vein 2, and produced to short black streaks on the veins; some fuscous suffusion on terminal area; a greyish subterminal line expanding into a spot at apex, then dentate inwards to vein 5 and outwards on veins 5 and 4; a fine lunulate terminal line. Hind-wing white, the veins and termen often tinged with fuscous.

♀ Fore-wing sometimes suffused with fuscous. *Exp.* ♂ 32-38, ♀ 40 mm.

Sokotra: Adho Dimellus (3500 ft.), 1 ♂, 18 ♀; Jena-agahan (1400 ft.), 1 ♀; Hadibu Plain, 5 ♂.

Extremely like *A. corticea*, Schiff, but with very much shorter branches to the antennæ.

[Common at sugar; also came to light.—*W.R.O.G.*]

Hadena, *Schrank*.**6. Hadena consanguis**, *Guen.**Hadena consanguis*, Guen., Noct., ii. p. 97.Sokotra: Adho Dimellus (3500 ft.), 2 ♂; Homhil (2500 ft.), 1 ♀;
Hadibu Plain, 1 ♂.[Taken at light and at sugar.—*W.R.O.G.*]**Leucania**, *Ochs.***7. Leucania scirpi**, *Dup.**Leucania scirpi*, Dup., Hist. Nat. Lep., iii. p. 32.

Sokotra: Adho Dimellus (3590 ft.), 1 ♀.

Euplexia, *Steph.***8. Euplexia conducta**, *Wlk.**Caradrina conducta*, Wlk., x. p. 296.

Sokotra: Adho Dimellus (3500 ft.), 3 ♂, 8 ♀.

Spodoptera, *Guen.***9. Spodoptera mauritia**, *Boisd.**Hadena mauritia*, Boisd., Faun. Ent. Madag., Lep., p. 92.

Sokotra: Adho Dimellus (3500 ft.), 2 ♂.

Caradrina, *Ochs.***10. Caradrina orbicularis**, *Wlk.* (Plate xx. fig. 26.)*Caradrina orbicularis*, Wlk., x. p. 294.

Sokotra: Adho Dimellus (3500 ft.), 1 ♂.

11. Caradrina exigua, *Hübner*.*Noctua exigua*, Hübner., Samml. Eur. Schmett. Noct. fig. 362.

Sokotra: Hadibu Plain, 1 ♀.

12. Caradrina partita, *Wlk.* (Plate xx. fig. 24.)*Caradrina partita*, Wlk., x., p. 294.

Sokotra: Adho Dimellus (3500 ft.), 3 ♀.

Amyna, *Guen.***13. Amyna octo**, *Guen.**Amyna octo*, Guen., Noct. 1, p. 233.

Sokotra: Jena-agahan (2500 ft.), 1 ♂; Dahamis, 1 ♀.

14. Amyna selenampha, *Guen.**Amyna selenampha*, Guen., Noct. 1, p. 406.

Sokotra: Moukaradia (= Gebel Raggit) (600 ft.), 1 ♂; Hadibu Plain, 1 ♀.

Calloplistria, *Hübner*.**15. Calloplistria recurvata**, *Moore*. (Plate xx. fig. 8.)*Calloplistria recurvata*, Moore, Lep. Atk. p. 144.

Sokotra: Adho Dimellus (3500 ft.), 7 ♂, 5 ♀; Jena-agahan (1140 ft.), 1 ♀.

[Taken at light, also found common on the damp shady parts of the track below Adho Dimellus at about 3000 feet.—*H.R.O.G.*]**ACONTIANÆ.****Megalodes**, *Guenée*.**16. Megalodes insocia**, *Wlk.* (Plate xx. fig. 6.)*Acontia insocia*, Wlk., xii., 788.

Sokotra: Hadibu Plain, 1 ♂.

Tarache, *Hübner*.**17. Tarache hortensis**, *Swinh.**Acontia hortensis*, Swinh., P.Z.S., 1884, p. 517, pl. xlvii. fig. 7.

Sokotra: Hadibu Plain, 2 ♂.

18. Tarache melæna, *Hmps.* (Plate xx. figs. 9, 10.)*Tarache melæna*, Hmps., Bull. Liverp. Muss., ii. p. 36 (1889).

♀ Head and abdomen fuscous; thorax black. Fore-wing glossy black-brown; a white antemedial band with nearly straight, almost erect edges bounded by black lines, the band sometimes narrower or not extending below vein 1, or in one specimen reduced to a grey spot on costa; a triangular postmedial white spot on costa with the minutely dentate postmedial black line arising from it, strongly incurved below vein 3; a terminal series of white points usually present, and sometimes some slight subterminal marks towards tornus. Hind-wing dark fuscous.

Exp. 20 mm.

Sokotra: Hadibu Plain, 9 ♀.

[Taken at light.—*H.R.O.G.*]**Acontia**, *Ochs.***19. Acontia malvæ**, *Esper*.*Noctua malvæ*, Esp., Schmett., iv., 2, p. 63, pl. cxv. fig. 4.

Sokotra: Hadibu Plain, 1 ♂.

Metachrostis, *Hübner*.**20. Metachrostis terminipuncta**, *Hmps.* (Plate xx. fig. 2.)*Metachrostis terminipuncta*, Hmps., Bull. Liverp. Muss., ii. p. 36 (1889).

♂ Head and thorax red-brown; abdomen fuscous. Fore-wing with the basal half pale red-brown; two subbasal black points on costa with short obscure lines from them; two antemedial wavy red-brown lines arising from black points on costa; a wavy medial line with the area beyond it deep red-brown with some pale patches; an oblique

discoïdal lunule with some black on its inner edge ; a blackish mark in submedian fold before the double, minutely dentate, postmedial line which is bent outwards between veins 6 and 3 ; a sinuous subterminal line with a prominent black spot beyond it on termen above vein 5 ; some slight terminal black lunules. Hind-wing dark fuscous, the underside brown, irrorated with fuscous, with dark discoïdal point and waved postmedial line. *Exp.* 28 mm.

Sokotra : Adho Dimellus (3500 ft.), 1 ♂.

21. *Metachrostis badia*, Swinh.

Acontia badia, Swinh., P.Z.S., 1886, p. 445.

Sokotra : Adho Dimellus (1500 ft.), 1 ♂ : Hadibu Plain, 1 ♂.

22. *Metachrostis pulla*, Swinh.

Acontia pulla, Swinh., P.Z.S., 1885, p. 456, pl. xxvii. fig. 15.

Sokotra : Adho Dimellus (3500 ft.), 1 ♂ ; Jena-agahan (1200 ft.), 1 ♀.

Eublemma, Hübn.

23. *Eublemma bifasciata*, Moore.

Thalpocharis bifasciata, Moore, P.Z.S., 1881, p. 371.

Sokotra : Jena-agahan (1200 ft.), 1 ♂ : Hadibu Plain, 2 ♀.

The ground-colour much darker than in specimens from Aden and India.

[Taken at light.—*W.R.O.G.*]

24. *Eublemma admota*, Feld.

Acontia admota, Feld., Reis. Nov., pl. eviii. fig. 31.

Sokotra : Hadibu Plain, 1 ♀.

EUTELIANÆ.

Eutelia, Hübn.

25. *Eutelia bowkeri*, Feld.

Eurhopia bowkeri, Feld., Reis. Nov., pl. ex. fig. 29.

Sokotra : Adho Dimellus, 2 ♂, 2 ♀.

[Taken at sugar.—*W.R.O.G.*]

GONOPTERINÆ.

Cosmophila, Boisd.

26. *Cosmophila erosa*, Hübn.

Noctua erosa, Hübn., Zutr. Samml. Exot. Schmett., ii. 19, figs. 287, 288.

Sokotra : Adho Dimellus (3500 ft.), 1 ♂, 1 ♀.

Earias, Hübn.

27. *Earias insulana*, Boisd.

Tortrix insulana, Boisd., Faun. Madag., p. 121, pl. xvi. fig. 9.

Sokotra : Adho Dimellus (3500 ft.), 2 ♀.

28. *Earias uninotata*, Wlk.*Digba uninotata*, Wlk., Journ. Linn. Soc., vi. p. 108.

Sokotra: Jena-agahan (1300 ft.), 1 ♀.

NOCTUINÆ.

Cerocala*, Boisd.*29. *Cerocala socotrensis*, Hampsn. (Plate xx. fig. 27.)***Cerocala socotrensis*, Hampsn., Bull. Liverp. Mus., ii. p. 36 (1899).*Cerocala vermiculosa*, Dixey, P.Z.S., 1898, p. 383 (*nee* H.S.).

Head and thorax clothed with grey, fuscous, and brown scales; palpi white, except at tips, the vertex of head and front of tegulæ brownish-white; abdomen brownish-white, irrorated with fuscous; pectus and ventral surface white. Fore-wing with the base, costal area, and termen grey, irrorated with fuscous and brown, the rest of wing fuscous and brown, with leaden suffusion in parts; a fine black line from subcostal nervure before middle curved to above middle of inner margin, defined on outer side by grey, and followed by a broad rufous band; the orbicular small, black-edged, with brownish centre, and eleptical; the reniform grey, black-edged, somewhat quadrate; the postmedial black line oblique from below costa to vein 2, recurved to the inner edge of reniform, then excurved and bounding the rufous band, a large bar-shaped brown-irrorated white patch on its inner side beyond the cell; a subterminal brown line defined by whitish on inner side, strongly angled inwards in discal fold and slightly in submedian fold, with two black marks on its inner side below the upper angle, and slight marks above and below the lower angle; the termen suffused with brown; a erentulate terminal black line; cilia intersected with whitish. Hind-wing with the base and inner area brownish white; a slight blackish streak on inner area; an oblique blackish bar from upper angle of cell to the broad fuscous subterminal band at vein 2, and with a whitish patch beyond it, beyond the cell; two deep black subapical spots on termen; a large patch at middle extending on to cilia, with a small spot below it with white spot on its inner side; cilia white. Underside yellowish-white; fore-wing with oblique black bar from upper angle of cell to the sinuous postmedial line, the area beyond, which is brownish, with a large apical black patch; a white patch beyond the cell; hind-wing with small black spot on discocellulars and another beyond lower angle of cell.

Sokotra: Jena-agahan (2500 ft.), 1 ♀; Hadibu Plain, 12 ♂, 21 ♀.

Closely allied to *C. vermiculata*, H.S., from South Africa, but differs in the oblique discoidal band of hind-wings and black terminal spots.

[One of the commonest species of moth in Sokotra, coming freely to light. It proved a perfect nuisance at night in the tents, constantly putting out the candle if the lantern was left open for a moment.

It was most common on the plains, and found in numbers up to an elevation of about 2000 feet. I obtained one worn specimen at Adho Dimellus, but, unfortunately, did not preserve it.—*W.R.O.G.*]

Amefrontia, Hmps.

Amefrontia, Hmps., Bull. Liverp. Muss., ii. 2, p. 37 (1899).

Type A purpurea.

Palpi oblique, reaching just beyond the large frontal tuft, which has a flattened corneous plate below it with rounded edge; antennae bipectinate, with moderate branches; tibiae without spines. Fore-wing with areole; the costa slightly arched; the termen obliquely curved; the cilia non-crenulate. Hind-wing with vein 5 from well above angle of cell.

30. Amefrontia purpurea, Hmps. (Plate xx. fig. 11.)

Amefrontia purpurea, Hmps., Bull. Liverp. Muss., ii. p. 37 (1899).

♂ Head and thorax vinous red; antennae black-brown with white tips; legs brown, the joints ringed with white; abdomen ochreous-brown. Fore-wing vinous-red; the disc tinged with brown; the orbicular and reniform ochreous-white with some purplish scales at centre; an indistinct, dark, waved, antemedial line; a crenulate, slightly curved postmedial line with short streak beyond it on the veins; a terminal series of ochreous points. Hind-wing white, tinged with fuscous. *Exp.* 22 mm.

Sokotra: Hadibu Plain, 1 ♂.

31. Amefrontia albiluna, Hmps. (Plate xx. fig. 12.)

Amefrontia albiluna, Hmps., Bull. Liverp. Muss., ii. p. 37 (1899).

♀ Head and thorax ochreous brown, mixed with darker scales; fore tarsi banded with black; abdomen ochreous-white, slightly tinged with fuscous. Fore-wing ochreous-brown, irrorated with dark brown; traces of a sinuous antemedial line with a dark shade on its inner side and some black scales on its outer; a medial dark shade angled at lower angle of cell; a black discoidal lunule with a white lunule on its outer edge; the postmedial line double, excurved from costa to vein 3, then incurved, some black points on its inner side, and fuscous-grey suffusion beyond it. Hind-wing whitish, the terminal half suffused with fuscous; cilia whitish. *Exp.* 20 mm.

Sokotra: Hadibu Plain, 2 ♀.

[Both this and the previous species were taken at light.—*W.R.O.G.*]

Catephia, Ochs.

32. Catephia linteola, Guen.

Catephia linteola, Guen., Noct., iii. p. 44.

Sokotra: Adho Dimellus (3500 ft.), 43 ♂, 5 ♀.

[Common at sugar. Only met with at our highest camp.—*W.R.O.G.*]

Ophiusa, Ochs.**33. Ophiusa serva, Fabr.***Noctua serva*, Fabr., Syst. Ent., p. 593.

Sokotra : Adho Dimellus (3500 ft.), 2 ♂, 3 ♀.

[Taken at sugar.—*W.R.O.G.*]**34. Ophiusa melicerte, Drury.***Noctua melicerte*, Drury, Ills. Exot. Ins., i. p. 46, pl. xxiii. fig. 1.

Sokotra : Hadibu Plain, 3 ♂, 1 ♀.

[Taken at sugar.—*W.R.O.G.*]**35. Ophiusa dianaris, Guen.** (Plate xx. fig. 15.)*Ophiodes dianaris*, Guen., Noct., iii. p. 232.

Sokotra : Adho Dimellus (3500 ft.), 3 ♂, 2 ♀.

[Taken at sugar, and once obtained during the day.—*W.R.O.G.*]**36. Ophiusa tirrhaca, Cram.***Noctua tirrhaca*, Cram., Pap. Exot., ii., pl. clxxvi, e.

Sokotra : Adho Dimellus (3500 ft.), 3 ♀.

[Two taken at sugar ; one specimen came to light.—*W.R.O.G.*]**Baniana Wlk.****37. Baniana intorta, Swinh.** (Plate xx. fig. 14.)*Athyria intorta*, Swinh., Trans. Ent. Soc., 1891, p. 150.

Sokotra : Hadibu Plain, 2 ♂.

[Taken at light.—*W.R.O.G.*]**Acantholipes, Lederer.****38. Acantholipes circumdatus, Wlk.***Hydrelia circumdata*, Wlk., xv., 1763.

Sokotra : Adho Dimellus (3500 ft.), 1 ♀ ; Jena-agahan (1140 ft.), 2 ♂ ;

Moukaradia (= Gebel Raggit) (600 ft.), 1 ♂ ; Hadibu Plain, 6 ♂, 6 ♀.

[Taken at light.—*W.R.O.G.*]**Calpe, Tr.****39. Calpe emarginata, Fabr.***Noctua emarginata*, Fabr., Ent. Syst., iii. 2, p. 82.

Sokotra : Adho Dimellus (3500 ft.), 3 ♀.

[Came to light.—*W.R.O.G.*]**Plusia, Ochs.****40. Plusia eriosoma, Doubl.***Plusia eriosoma*, Doubl., Dieffenbach's New Zealand, ii. p. 288.

Sokotra : Moukaradia (= Gebel Raggit) (600 ft.), 3 ♂.

[Captured in the daylight among the grass and undergrowth on the hill side.—*W.R.O.G.*]

HYPENINÆ.

Simplicia, *Guen.***41. *Simplicia robustalis***, *Guen.**Herminia robustalis*, Guen., Delt. & Pyr., p. 58.

Sokotra: Adho Dimellus (3000 ft.), 1 ♀.

Hypena, *Schrank.***42. *Hypena masurialis***, *Guen.**Hypena masurialis*, Guen., Delt. & Pyr., p. 38.

Sokotra: Dahamis (500 ft.), 1 ♀; Hadibu Plain.

43. *Hypena lividalis*, *Hubn.**Pyralis lividalis*, Hubn., Samml. Eur. Schmett., Pyr., fig. 11, 186.

Sokotra: Jena-agahan (2500 ft.), 1 ♂, 1 ♀; Dahamis (1000 ft.), 1 ♀.

44. *Hypena abyssinialis*, *Guen.**Hypena abyssinialis*, Guen., Delt. & Pyr., p. 39.

Sokotra: Adho Dimellus (2500 ft.), 1 ♀.

45. *Hypena sinialis*, *Guen.**Hypena sinialis*, Guen., Delt. & Pyr., p. 30.

Sokotra: Adho Dimellus (3500 ft.), 1 ♂, 1 ♀.

Rhæsena, *Wlk.***46. *Rhæsena transcissa***, *Wlk.**Rhæsena transcissa*, Wlk., xxxv. 1974.

Sokotra: Adho Dimellus (3500 ft.), 1 ♂.

Galleridia, *Hmps.***47. *Galleridia atrisigna***, *Hmps.**Galleridia atrisigna*, Hmps., Moths Ind., iv. p. 499.

Sokotra: Jena-agahan (1200 ft.), 1 ♂; Hadibu Plain, 3 ♂.

SPHINGIDÆ.

Chærocampa, *Dup.***48. *Chærocampa celerio***, *Linn.**Sphinx celerio*, Linn., Syst. Nat., i. p. 800.

Sokotra: Homhil (1500 ft.), 1 ♀.

[Taken at light in tent. Other pupæ apparently of this species were destroyed by small ants on the voyage home.—*W.R.O.G.*]

GEOMETRIDÆ.

BOARMIANÆ.

Hyperythra, *Guen.*49. **Hyperythra ædiphebia**, *Hmps.* (Plate xx. fig. 21.)*Hyperythra ædiphebia*, Hmps., Bull. Liverp. Muss., ii. p. 37 (1899).*Hyperythra lucicolor*, Dixey, P.Z.S., 1898, p. 383 (*nec* Butl.).

♂ Fore-wing without fovea: hind-wing with the base of costal vein swollen. Orange-yellow: antennæ with the branches brownish; palpi at sides and legs thickly irrorated with red-brown; abdomen slightly irrorated with brown; wings with fine red-brown striae. Fore-wing with indistinct antemedial brown line bent inwards to costa; a similar but more prominent medial line with darker discoidal striga on it; an oblique subterminal bar from costa, with traces of a line arising from it, and dark point beyond it above vein 3. Hind-wing with almost medial, slightly oblique, brown line, and curved diffused subterminal line. *Exp.* 28 mm.

Sokotra: Hadibu Plain, 3 ♂

[Beaten out of a small thorny bush on the plain.—*W.R.O.G.*]**Boarmia**, *Tr.*50. **Boarmia acaciaria**, *Boisd.**Boarmia acaciaria*, Boisd., Faun. Ent. Madag., Lep., 116, pl. xvi, fig. 4.

Sokotra: Adho Dimellus (3500 ft.), 1 ♂, 4 ♀.

[Taken both at light and at sugar.—*W.R.O.G.*]

LARENTIANÆ.

Scotosia, *Steph.*51. **Scotosia rubritincta**, *Hmps.* (Plate xx. fig. 20.)*Scotosia rubritincta*, Hmps., Bull. Liverp. Muss., ii. p. 38 (1899).

Grey and red-brown, thickly irrorated and strongly suffused with black; pectus, underside of legs, and ventral surface of abdomen, whitish; wings with numerous indistinct waved dark lines. Fore-wing with more distinct subbasal line angled below costa; an antemedial line excurved below costa and angled in submedian interspace, the medial area somewhat darker with dark streaks on the veins and discoidal bar; the postmedial line defined by grey, dentate and strongly angled outwards between veins 4 and 2; the terminal area darker, with dentate grey subterminal line. Hind-wing with discoidal point; a minutely dentate postmedial line defined by grey and angled outwards beyond lower angle of cell; the terminal area darker, with dentate greyish subterminal line, both wings with terminal series of pale points and fine black striae. Underside yellowish white, striated with fuscous; black discoidal spots and postmedial line angled beyond

the cell ; the terminal area black with whitish spots on fore-wing and waved line on hind-wing. *Exp.* 32-40 mm.

Sokotra : Adho Dimellus (3500 ft.), 1 ♂, 1 ♀ ; Homhil (1500 ft.), 1 ♀ ; Jena-agahan (1200 ft.), 3 ♂, 1 ♀ ; Hadibu Plain, 1 ♂ ; off west end of Sokotra, 1 ♂.

One ♀ of this species was obtained in British East Africa by Dr. Gregory. [Most of the examples were taken at light : the first met with came to the electric light on board the 'Elphinstone,' when we were anchored off the west end of Sokotra.—*W.R.O.G.*]

Cidaria, Tr.

52. Cidaria holophæa, Hmps. (Plate xx. figs. 3, 22).

Cidaria holophæa, Hmps., Bull. Liverp. Muss., ii. p. 38 (1899).

♂ Dark fuscous brown. Fore-wing with three or four minutely waved lines on basal area slightly angled below costa ; two antemedial lines with reddish-brown between them, the inner line waved, the outer slightly angled inwards in submedian fold ; a discoidal point ; two postmedial lines with red-brown between them, the inner minutely waved and angled below costa, the outer slightly defined by grey and strongly angled outwards beyond lower angle of cell, then incurved, and with indistinct waved lines beyond it ; a waved grey subterminal line with black marks in its curves ; a fine black terminal line. Hind-wing with two medial lines slightly angled at middle, with indistinct waved lines between and beyond them, an indistinct waved grey subterminal line, and punctiform black terminal line.

♀ Fore-wing with the medial area much darker, and usually strongly defined by grey before and beyond it ; the subterminal line with the black marks prominent. *Exp.* 30 mm.

Sokotra : Adho Dimellus (3500 ft.), 14 ♂, 5 ♀.

[Common on the highest part of the Haghier range, at an elevation of about 3000-4000 feet. In creeping through the thicker parts of the bush one constantly came across these moths at rest on the stems, but they were very easily disturbed and difficult to box. At night they came freely to light, and numbers might, with the aid of a lantern, be taken resting on the spear grass.—*W.R.O.G.*]

ACIDALIANÆ.

Craspedia, Hubn.

53. Craspedia fulvicolor, Hmps. (Plate xx. fig. 7.)

Craspedia fulvicolor, Hmps., Bull. Liverp. Muss., ii. p. 38 (1899).

Craspedia pulverosaria, (?) Dixey, P.Z.S., 1898, p. 383 (*nec* Wlk.).

Ochreous thickly irrorated with dark red ; frons and palpi chestnut ; vertex of head whitish. Fore-wing with antemedial series of three dark points on the veins angled on median nervure ; a dark discoidal spot with an indistinct, oblique, slightly sinuous line just beyond it ;

a postmedial series of dark points angled outwards at veins 6 and 4, and with traces of a waved line beyond it; a terminal series of points. Hind-wing with discoidal bar-shaped spot; an indistinct curved diffused medial line; a postmedial series of points slightly bent outwards below costa and excurved at median nervules; traces of a waved subterminal line; a terminal series of points. Hind tibiae of male not dilated and without spurs. *Exp.* 24-30 mm.

Sokotra: Adho Dimellus (3500 ft.), 2 ♀; Jena-agahan (1200 ft.), 2 ♀; Kamahamu (500 ft.), 1 ♀; Hadibu Plain, 1 ♂, 1 ♀.

[Taken at light.—*W.R.O.G.*]

54. *Craspedia remotata*, Guen.

Acidalia remotata, Guen. Phal., i. p. 458.

Craspedia lactaria, Dixey, P.Z.S., 1898, p. 383 (*nec* Wlk.).

Sokotra: Adho Dimellus (3500 ft.), 5 ♂, 7 ♀; Jena-agahan (1200 ft.), 1 ♂; Moukaradia (= Gebel Raggit) (600 ft.), 1 ♂.

[Taken at light.—*W.R.O.G.*]

55. *Craspedia actuaria*, Wlk.

Acidalia actuaria, Wlk., xxii. 752.

Craspedia derasata, Dixey, P.Z.S., 1898, p. 383 (*nec* Wlk.).

Sokotra: Adho Dimellus (3500 ft.), 2 ♀, 2 ♂; Hombil (1500 ft.), 1 ♂; Jena-agahan (1200 ft.), 2 ♂, 4 ♀; Hadibu Plain, 4 ♂, 5 ♀.

The ground colour varies from pale ochreous to bright rufous.

56. *Craspedia disparata*, Stgr. (Plate xx. fig. 18.)

Craspedia disparata, Stgr., ined.

Sokotra: Adho Dimellus (3500 ft.), 1 ♀; Moukaradia (= Gebel Raggit) (600 ft.), 1 ♀; Hadibu Plain, 1 ♂, 10 ♀.

Exactly agrees with a typical specimen from Mesopotamia, and one from Jumrood, N.W. India; it also occurs at Aden.

***Acidalia*, Tr.**

57. *Acidalia testacea*, Swinh.

Eupithecia testacea, Swinh., P.Z.S., 1885, p. 863, pl. lvii. fig. 15.

Sokotra: Jena-agahan (1200 ft.), 2 ♂; Hadibu Plain, 3 ♂, 1 ♀.

***Timandra*. Dup.**

58. *Timandra mundissima*, Wlk.

Acidalia mundissima, Wlk., xxiii. 795.

Sokotra: Jena-agahan (2500 ft.), 1 ♂.

GEOMETRINÆ.

Nemoria, *Hübner*.**59. *Nemoria directa***, *Wlk.**Nemoria directa*, Wlk., xxii. 535.Sokotra : Adho Dimellus (3500 ft.), 1 ♀ ; Jena-agahan (1200 ft.), 1 ♀ ;
Hadibu Plain, 1 ♂, 4 ♀.

COSSIDÆ.

Azygophleps, *Hmps.***60. *Azygophleps inclusa***, *Wlk.* (Plate xx. fig. 13.)*Zeuzera inclusa*, Wlk., vii. 1534

Sokotra : Hadibu Plain, 1 ♂.

Eremocossus.**61. *Eremocossus proleuca***, *Hmps.**Eremocossus proleuca*, Hmps., P.Z.S., 1896, p. 276, pl. x. fig. 4.

Sokotra : Hadibu Plain, 1 ♂.

PYRALIDÆ.

CRAMBINÆ.

Culladia, *Moore*.**62. *Culladia admigratella***, *Wlk.**Araxes admigratella*, Wlk., xxvii. 192.

Sokotra : Hadibu Plain, 2 ♂.

PHYCITINÆ.

Hypogryphia, *Rag.***63. *Hypogryphia pulvrealis***, *Hmps.* Plate xx. fig. 16.*Hypogryphia pulvrealis*, Hmps., Bull. Liverp. Mus., ii. p. 39 (1899).

Grey-white thickly irrorated with fuscous. Fore-wing with indistinct antemedial dark line strongly angled in submedian fold ; a medial line strongly angled outwards in cell and submedian fold and inwards on median nervure and vein 1 ; a dark point at lower angle of cell ; the postmedial line angled inwards at vein 6 and in submedian fold, bent outwards and minutely dentate between veins 5 and 2 ; a prominent terminal series of points. Abdomen and hind-wing uniform pale grey, the latter with traces of a curved subterminal line ; a fine terminal line, and line through the cilia. *Erg.* ♂ 22, ♀ 26 mm.

Sokotra : Jena-agahan, 1 ♂, 2 ♀.

Heterographis, *Rag.***64. *Heterographis* (Staudingeria) *suboblitella***, *Rag.**Heterographis suboblitella*, Rag., Nouv. Gen., p. 29.

Sokotra : Hadibu Plain, 1 ♀.

65. *Heterographis pygmælla*, Hmps.*Heterographis pygmaella*, Hmps., Moths Ind., iv. p. 69.

Sokotra : Adho Dimellus (1500 ft.), 1 ♀ ; Hadibu Plain, 3 ♂, 2 ♀.

66. *Heterographis flammealis*, Hmps. (Plate xx. fig. 19.)*Heterographis flammealis*, Hmps., Bull. Liverp. Mus., ii. p. 39 (1899).

Head ochreous whitish ; thorax and abdomen pale red-brown, the tegulae whitish in front. Fore-wing vinous red, irrorated with white and fuscous ; the basal inner area without irroration : a medial orange-yellow band with waved edges produced along costa to well beyond middle, and with a red band, not irrorated, beyond it ; a black discoidal point ; a patch of red-brown on terminal area. Hind-wing pale semi-hyaline, tinged with brown, especially towards termen : a fine terminal line, and line through the cilia. *Exp.* 14 mm.

Sokotra : Adho Dimellus (3500 ft.), 1 ♀ ; Hadibu Plain, 1 ♂, 1 ♀.

Nephopteryx*, Hübn.*67. *Nephopteryx serratella*, Rag.***Myrlaea serratella*, Rag., Rom. Mém., vii. p. 399, pl. xv. fig. 23.

Maxillary palpi of male in the form of a triangular tuft appressed against frons ; antennae pectinate with uniseriate branches, the sinus and tuft large.

Sokotra : Hadibu Plain, 6 ♂, 24 ♀.

68. *Nephopteryx* (*Oligochroa*) *terrella*, Rag.*Oligochroa terrella*, Rag., Nouv. Gen., p. 20 ; Rom. Mém., vii. p. 389, pl. xiii. fig. 15.

Sokotra : Adho Dimellus (3500 ft.), 1 ♂, 6 ♀ ; Jena-agahan (1200 ft.), 1 ♀.

69. *Nephopteryx* (*Thylacoptila*) *paurosema*, Meyr.*Thylacoptila paurosema*, Meyr., Ent. Mo. Mag., xxii. p. 166 (1885).

Sokotra : Hadibu Plain, 1 ♂.

Epicrocis*, Zell.*70. *Epicrocis* (*Candiope*) *uberalis*, Swinh.***Pyralis uberalis*, Swinh., P.Z.S., 1884, p. 523, pl. xlviii. fig. 10.

Sokotra : Hadibu Plain, 2 ♀.

Etiella*, Zell.*71. *Etiella zinckenella*, Treitschke.***Pinea zinckenella*, Treitschke, Schmett., Eur., ix. 1, p. 201.

Sokotra : Homhil (2500 ft.), 1 ♂ ; Hadibu Plain, 1 ♀.

HYDROCAMPINÆ.

Nymphula, *Schrank*.**72. Nymphula affinalis**, *Guen.**Paraponyx affinalis*, Guen., Delt. & Pyr., p. 270.*Oligostigma incommoda*, Butl., P.Z.S., 1881, p. 180.

Sokotra : 1 ♀ taken by Professor I. B. Balfour ; but the species was not seen by the present Expedition.

Stenia, *Guen.***73. Stenia grisealis**, *Hmps.* (Plate xx. figs. 4, 23).*Stenia grisealis*, Hmps., Bull. Liverp. Muss., ii. p. 39 (1899).

Grey-brown ; palpi white at base ; frons edged with white ; antennæ with the shaft white above ; legs and ventral surface of abdomen striped with white. Fore-wing with the costal edge white ; a yellowish spot below vein 2, near its base, sometimes almost obsolete, sometimes with traces of spots in cell and above veins 2, 5, and 6. Hind-wing paler ; the cilia white. *Exp.* 18 mm.

Sokotra : Adho Dimellus (3500-1500 ft.), 2 ♂, 2 ♀ ; Homhil (2500 ft.), 1 ♂ ; Jena-agahan (1200 ft.), 1 ♂ ; Hadibu Plain, 13 ♀.

SCOPARIANÆ.

Scoparia, *How.***74. Scoparia murificalis**, *Wlk.* (Plate xx. fig. 25.)*Scoparia murificalis*, Wlk., xix. 826.

Sokotra : Adho Dimellus (1500 ft.), 1 ♂.

PRYAUSTINÆ.

Zinckenia, *Zell.***75. Zinckenia fascialis**, *Cram.**Pyralis fascialis*, Cram., Pap. Exot., iv. pl. ccxcviii. o.

Sokotra : Hadibu Plain, 3 ♀.

Syngamia, *Guen.***76. Syngamia abruptalis**, *Wkr.**Azopia abruptalis*, Wlk., xvii. 371.

Sokotra : Homhil (2500 ft.), 4 ♀.

Hellula, *Guen.***77. Hellula undalis**, *Fabr.**Pyralis undalis*, Fabr., Ent. Syst., iii. 2, p. 226.

Sokotra : Hadibu Plain, 1 ♀.

Phlyctænodes, Guen.**78. Phlyctænodes undalis, Hübn.**

Pyralis undalis, Hübn., Samml. Eur. Schmett., Pyr., fig. 90.

Sokotra : 1 ♂ without exact locality.

Metasia, Guen.**79. Metasia corsicalis, Dup.**

Pyralis corsicalis, Dup., Lép. Fr., viii. p. 306, pl. cexxx. figs. 6, 7.

Sokotra : Jena-agahan (1200 ft.), 1 ♀ ; Hadibu Plain, 1 ♂ .

80. Metasia prionogramma, Meyr. (Plate xx. fig. 5.)

Metasia prionogramma, Meyr., Trans. Ent. Soc., 1886, p. 265.

Sokotra : Hadibu Plain, 2 ♂ .

II.—The Moths of Abd-el-Kuri.

NOCTUIDÆ.

CARADRININÆ.

Caradrina, *Ochs.*

1. *Caradrina exigua*, *Hüb.*

Noctua exigua, Hüb., Samml. Eur. Schmett., Noct., fig. 362.

Abd-el-Kuri, 1 ♂.

SPHINGIDÆ.

Chærocampa, *Dup.*

2. *Chærocampa celerio*, *Linn.*

Sphinx celerio, Linn, Syst. Nat. i., p. 800.

Abd-el-Kuri, 1 ♂.

[One example bred from pupa.—*W.R.O.G.*]

PYRALIDÆ.

PHYCITINÆ.

Heterographis, *Rag.*

3. *Heterographis* (*Staudingeria*) *innotalis*, *Hmps.* (Plate xx. fig. 17.)

Heterographis (*Staudingeria*) *innotalis*, Hmps., Bull. Liverp. Mus., ii. p. 39 (1899).

♂ Head and thorax pale red-brown; palpi below, edges of tegulæ and upper edge of patagia white; a slight dorsal tuft on first segment of abdomen, pectus, greater part of legs, and ventral surface of abdomen white. Fore-wing pale red-brown; a white patch at base of inner margin; the marginal areas broadly and strongly irrorated with fuscous. Hind-wing semi-hyaline white, the terminal area tinged with fuscous. The antennæ with very long cilia, as in the *H. yerburi* from Aden. *Exp.* 24 mm.

Abd-el-Kuri, 1 ♂.

PYRAUSTINÆ.

Zinckenia, *Zell.*

4. *Zinckenia fascialis*, *Cram.*

Pyralis fascialis, Cram., Pap. Exot., iv. pl. cccxviii., o.

Abd-el-Kuri, 1 ♂, 2 ♀.

Glyphodes, Guen.**5. Glyphodes indica, Saund.**

Eudiotis indica, Saund., Trans. Ent. Soc. (2), i. p. 163 (1851).

Abd-el-Kuri, 1 ♂.

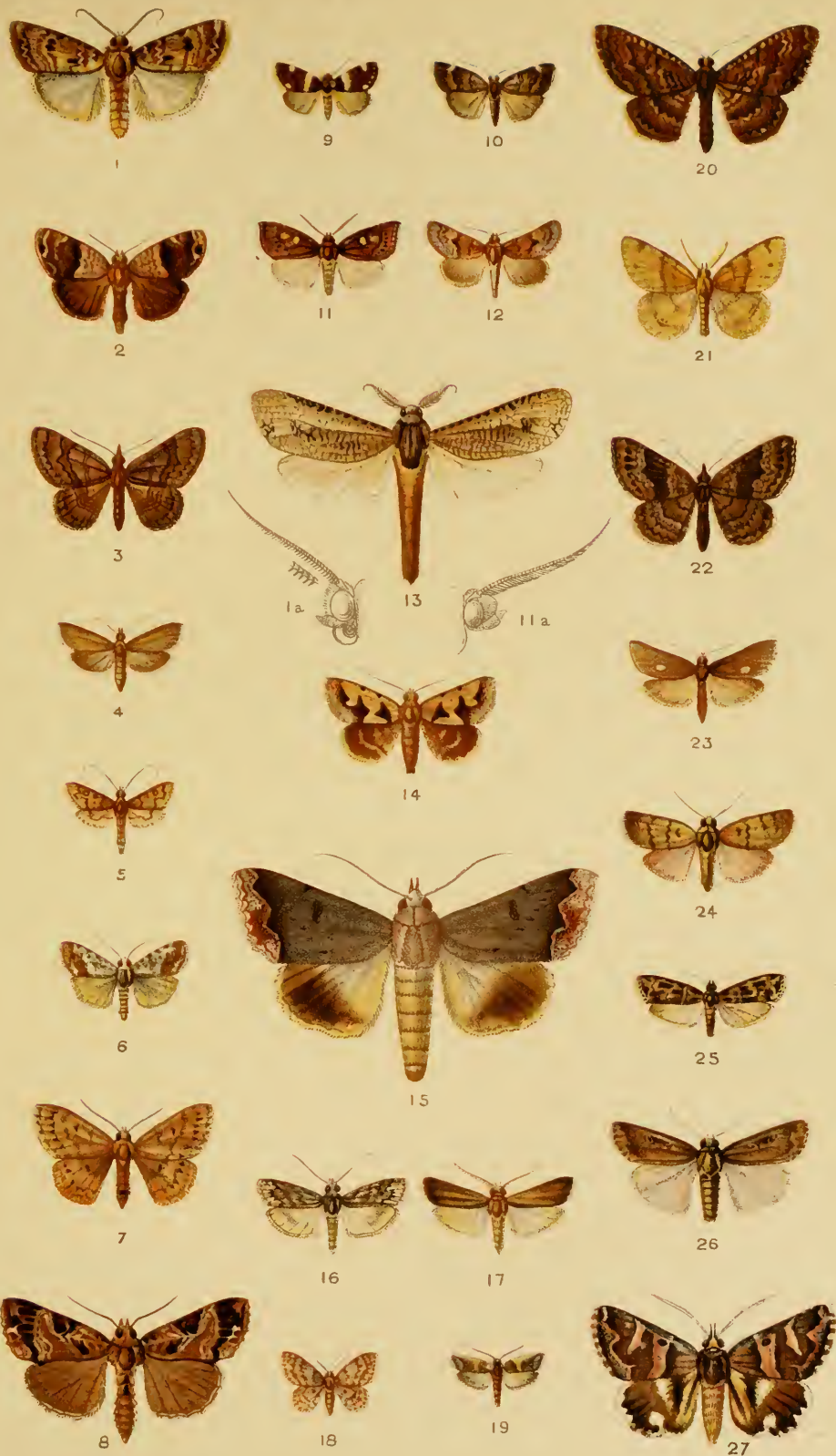
Antigastra, Led.**6. Antigastra catalaunalis, Dup.**

Pyralis catalaunalis, Dup., Lép. Fr., viii. p. 330, pl. ccxxxii., fig. 8.

Abd-el-Kuri, 1 ♂, 1 ♀.

PLATE XX.

- Fig. 1. AGROTIS BRACHYPECTEN, *Hmps.*, p. 322.
- Fig. 2. METACHROSTIS TERMINIPUNCTA, *Hmps.*, p. 324.
- Figs. 3, 22. CIDARIA HOLOPHÆA, *Hmps.*, p. 331.
- Figs. 4, 23. STENIA GRISEALIS, *Hmps.*, p. 335.
- Fig. 5. METASIA PRIONOGRAMMA, *Meyr.*, p. 336.
- Fig. 6. MEGALODES INSOCIA, *Wlk.*, p. 324.
- Fig. 7. CRASPEDIA FULVICOLOR, *Hmps.*, p. 331.
- Fig. 8. CALLOPISTRIA RECURVATA, *Moore*, p. 324.
- Figs. 9, 10. TARACHE MELÆNA, *Hmps.*, p. 324.
- Fig. 11. AMEFRONTIA PURPUREA, *Hmps.*, p. 327.
- Fig. 11a. ... *Antenna of same enlarged.*
- Fig. 12. AMEFRONTIA ALBILUNA, *Hmps.*, p. 327.
- Fig. 13. AZYGOPHLEPS INCLUSA, *Wlk.*, p. 333.
- Fig. 14. BANIANA INTORTA, *Swinh.*, p. 328.
- Fig. 15. OPHIUSA DIANARIS, *Guen.*, p. 328.
- Fig. 16. HYPOGRYPHIA PULVEREALIS, *Hmps.*, p. 333.
- Fig. 17. HETEROGRAPHIS INNOTALIS, *Hmps.*, p. 337.
- Fig. 18. CRASPEDIA DISPARATA, *Stgr.*, p. 332.
- Fig. 19. HETEROGRAPHIS FLAMMEALIS, *Hmps.*, p. 334.
- Fig. 20. SCOTOSIA RUBRITINCTA, *Hmps.*, p. 330.
- Fig. 21. HYPERYTHRA ÆDIPHLEBIA, *Wlk.*, p. 330.
- Fig. 24. CARADRINA PARTITA, *Wlk.*, p. 323.
- Fig. 25. SCOPARIA MURIFICALIS, *Wlk.*, p. 335.
- Fig. 26. CARADRINA ORBICULARIS, *Wlk.*, p. 323.
- Fig. 27. CEROCALA SOCOTRENSIS, *Hmps.*, p. 326.



ECKnight ad nat. lith

West, Newman chromo

ARTHROPODA.

Insecta:

Lepidoptera.—III.

Pterophoridæ and Tineina.

By The Right Hon.

LORD WALSINGHAM, M.A., LL.D., F.R.S.

PLATE XXI.

Moths II.

With so small a selection from among the numerous species which must undoubtedly occur in the island of Sokotra, it would be premature to express any decided opinion as to the geographical affinities of the island fauna : indeed, there are no sufficient indications to warrant the claim that these insular forms are more intimately related to one of the adjacent continents than to the other. With few exceptions they conform to the ordinary Mediterranean type, although in all cases specially distinct. One new species is interesting as occurring also in West Africa, on the Gambian coast, affording a parallel instance to that of *Laverna gambiella*, Wlsm., already recorded from the Gambia and Aden.

Some inconvenience occasionally arises in describing *Lepidoptera*, from the fact that no single term has hitherto been used to express the angle so frequently formed on the dorsum of the fore- or hind-wings in the direction of the base. On the hind-wing this angle is usually described as the abdominal angle, and the margin between this and the base is called the abdominal margin. I should propose, for convenience of description, that the word *flexus* be applied to the abdominal angle and to its equivalent when it occurs on the fore-wing, that the term *dorsum* should be limited to that portion of the margin which lies beyond it, except when no appreciable angle exists, and that the term *limbus* should be used for that portion of the margin lying between the flexus and the base. I have made use of these terms in the present paper.

I must express my thanks to Mr. W. R. Ogilvie-Grant and Dr. H. O. Forbes for the opportunity they have afforded me of working out this small but interesting collection.

The following signs are used in this paper :—

* = invalid, as not containing the type of the conception.

† = wrongly written either in inception or in adoption.

[Wlsm. & Drnt., Merton Rules, p. 18 (1896).]

In deference to the wishes of the Editor, *i.e.* numerals have been substituted for *capts.*, which I habitually employ when quoting volumes or plates.

The Micros of Sokotra.

PYRALIDINA.

PTEROPHORIDÆ.

Trichoptilus, Wlsm.

1. *Trichoptilus oxydactylus*, Wkr.

n. synn. = *hawaiiensis*, Btl. ; = *centetes*, Meyr.

Pterophorus oxydactylus, Wkr., Cat. Lp. Ins. B. M. xxx. 944 (1864) ¹.

Aciptilia hawaiiensis, Btl. Ann. and Mag. N. H. (5. s.) vii. 408 (1881) ².

Aciptilia oxydactyla, Wlsm., Pr. Z. Soc. Lond., 1885, 885 (1886) ³.

Trichoptilus centetes, Meyr., Tr. Ent. Soc. Lond., 1886, 16-17 ⁴ : 1887, 266 ⁵.

Pterophorus oxydactylus, Moore, Lp. Ceyl. iii. 528-9, Pl. 209, 16 (1887) ⁶.

Trichoptilus hawaiiensis, Meyr., Tr. Ent. Soc., Lond., 1888, 239 ⁷.

Pterophorus oxydactylus, Swinh. & Cotes, Cat. Moths Ind. 669, No. 4549 (1889) ⁸.

Trichoptilus centetes, Wlsm., Pr. Z. Soc., Lond., 1891, 494-5, 542 (1892) ⁹.

Trichoptilus oxydactylus, Wlsm., Pr. Z. Soc., Lond., 1896, 277 ¹⁰.

Trichoptilus centetes, Wlsm., Pr. Z. Soc., Lond., 1897, 56, No. 1 ¹¹ : Ent. Mo. Mag. xxxiv. 192 (1898) ¹².

Sokotra : Hadibu Plain, 12-15. XII. 98 ; Abd-el-Kuri Id. 1-3. XII. 98.—
Seven specimens.

[? United States ^(9, 12) ? Mexico ⁽⁹⁾. West Indies ^(9, 11). Arabia ⁽¹⁰⁾. India ^(3, 8).
Ceylon ^(1, 6, 8). New Guinea ⁽⁴⁾. Queensland ⁽⁵⁾. Hawaiiia ^(2, 7).

TINEINA.

GELECHIADÆ.

Onebala, Wkr.

2. *Onebala simplex*, Wlsm. (Plate xxi. fig. 2.)

Onebala simplex, Wlsm., Bull. Liverp. Muss., iii. p. 2 (1900).

Antennæ slightly serrate ; pale fawn-ochreous, dusted with greyish fuscous above, the basal joint dark fuscous above. *Palpi* long, strongly recurved, smooth, the median joint somewhat flattened ; pale fawn, ochreous. *Head* greyish. *Thorax* pale fawn-ochreous, smeared with greyish fuscous above. *Fore-wings* pale fawn-ochreous, slightly shaded with greyish fuscous, especially above the fold and before the apex and termen ; with three blackish spots, the first on the cell before the middle, another in the fold straight below it, a third at the end of the cell ; also four or five blackish dentate spots along the termen at the base of the greyish ochreous cilia which have a paler basal line. *Exp.*

al. 11.5 mm. *Hind-wings* pale greyish, the central portion slightly iridescent; cilia brownish grey. *Abdomen* fawn-ochreous, with greyish fuscous shading. *Legs* pale cinereous.

Type ♂ (13361) Mus. Wlsm.

Sokotra: Adho Dimellus (3500 ft., 2. II. 99).—Unique.

This has the true neuration of *Onebala*, Wkr., 2 and 3 of the fore-wings stalked, 7 and 8 stalked, 9 separate. The *Onebala* of Meyrick (Tr. Ent. Soc. Lond. 1894, 15-16) = *Coydalla*, Wkr., not *Onebala* Wkr.

Frisilia, Wkr.

3. Frisilia (?), sp.

Sokotra: Adho Dimellus (3500 ft., 12. II. 99). [Wlsm. Coll. 13386.]

An utterly worn specimen belonging to the *Gelerchia* and allied to *Frisilia*, Wkr., but in the fore-wings 7 and 8 (coincident) are stalked with 9, 7 + 8 to costa; 2 and 3 (coincident) are shortly stalked with 4 and connate with 5.

Hypsolophus, F.

= † *Ypsolophus* (F.), Auct.

I use this generic name in its accepted sense, but doubt the correctness of its application.

4. Hypsolophus granti, Wlsm. (Plate xxi. fig. 3.)

Hypsolophus granti, Wlsm., Bull. Liverp. Mus., iii. p. 2 (1900).

Antennae pale brownish testaceous, with some fuscous scaling near the basal joint. *Palpi* with the usual triangular tuft on the median joint, dark brownish externally, with a whitish line along its upper edge; the terminal joint white, speckled with black scales. *Head* and *Thorax* pale brownish testaceous. *Fore-wings* pale brownish testaceous, speckled with black; some short oblique fuscous streaks along the costa, and a few groups of similar scales about the middle and end of the cell, on the dorsum before the tornus and about the termen, with one erect black dorsal patch at one-sixth from the base (this patch, which is very distinct, occurs in one specimen only out of a series of five, but in one or two of the others it is indicated by a few dark scales in the same position; the ground-colour slightly varies either in the direction of paler brown or darker greyish testaceous, the shading on the termen being also variable in quantity, and the speckling of dark scales more or less grouped or tending to obliteration); cilia of the same colour as the wing-surface, slightly streaked with darker scales. *Exp. al.* 15-16 mm. *Hind-wings* with the termen slightly bisinuate; somewhat iridescent along the middle, brownish grey; cilia paler than the wing, and with a slender subochreous line along their base. *Abdomen* brownish grey (varying to brownish testaceous). *Legs* pale brownish, with rather speckled fuscous shading on their outer sides.

Type ♂ (13363); ♀ (13364) Mus. Wlsm.

Sokotra: Adho Dimellus (3500 ft., 2. II. 99); Hadibu Plain (19-21. II. 99).

—Five specimens.

This species approaches the Equatorial African *Hypsolophus basistriatus*, Wlsm., but is slightly smaller, with narrower wings, and less distinct markings. Veins 2 and 3 of the fore-wings are stalked.

5. *Hypsolophus thoracellus*, Wlsm. (Plate xxi. fig. 4.)

Hypsolophus thoracella, Wlsm., Bull. Liverp. Mus., iii. p. 3 (1900).

Antennae cinereous, dusted with blackish scales. *Palpi* with the usual projecting triangular tuft on the second joint, pale cinereous along its upper edge, dark greyish fuscous, minutely speckled with chestnut-brown about its base, and becoming chestnut-brown to the apex along its lower half: terminal joint pale cinereous, sprinkled with blackish scales. *Head* dark greyish fuscous, face pale chestnut-brown. *Thorax* chestnut-brown. *Fore wings* dark greyish fuscous, with a broad chestnut-brown streak from the base along the costa to a little beyond one-third; mottled along the extreme costa with fuscous, a small pale cinereous spot on the costa at its outer extremity, a larger pale cinereous spot occurring at the commencement of the costal cilia from which a faintly indicated pale band crosses to the tornus: from the dorsum close to the base arises an oblique streak of slightly raised scales reaching to the upper edge of the cell; at the end of the cell is a minute blackish spot, its inner and lower edge narrowly outlined with whitish scales; cilia greyish fuscous, with numerous pale brownish cinereous dentate points along their basal third, these extending around the apex and termen. *Exp. ul.* 16 mm. *Hind-wings* trapezoidal; somewhat iridescent, brownish grey, the costa and limbus tending more to brown, the central portion of the wing tending to grey with bluish iridescence: cilia pale brownish grey. *Abdomen* and *Legs* greyish brown, the latter thickly sprinkled with fuscous externally; the underside of the abdomen whitish peppered laterally with fuscous scales.

Type ♀ (13362) Mus. Wlsm.

Sokotra: Homhil (1500 ft., *excl.* 26. I. 1899).—Unique.

Veins 2 and 3 of the fore-wings are stalked. This specimen was bred by Mr. Grant, but the name of its food-plant is not recorded.

Gelechia, Hb.

Gelechia sarcochroma, Wlsm. (Plate xxi. fig. 5.)

Gelechia sarcochroma, Wlsm., Bull. Liverp. Mus., iii. p. 3 (1900).

Antennae pale cinereous, with fuscous bars across the upper side. *Palpi* with the median joint thickened with rough scales beneath; fleshy white, with two fuscous annulations on the terminal joint, a fuscous band on the outer side of the median joint at the base and some spots also near its apex. *Head* fleshy whitish. *Thorax* whitish flesh-colour,

with slight fuscous shading. *Fore-wings* whitish flesh-colour, with slight fuscous shading; with four fuscous costal spots, the first at the base, the second at about one-sixth, the third at about the middle, the fourth at the commencement of the costal cilia; a broad dorsal streak, arising at one-fifth from the base, terminates at the upper edge of the cell a little beyond the second costal spot, some of the flesh-coloured scales between this and the base are distinctly raised; there are a few fuscous scales beyond the middle of the cell and one or two in the fold beneath them; cilia dull greyish ochreous, faintly speckled with fuscous and tinted with flesh-colour about the apex. *Exp. al.* 16 mm. *Hind-wings* shining pale bluish grey; cilia very long, pale brownish ochreous. *Abdomen* pale brownish ochreous. *Legs* somewhat hairy above; whitish ochreous, with two fuscous spots externally at the base of the hind tibiae.

Type ♂ (13360) Mus. Wlsm.

Sokotra: Adho Dimellus (3500 ft., 2. II. 1899).—Unique.

HYPONOMEUTIDÆ.

Batrachedra, *Stn.*

7. *Batrachedra atomosella*, *Wlsm.* (Plate xxi. fig. 6.)

Batrachedra atomosella, Wlsm., Bull. Liverp. Muss., iii. p. 4 (1900).

Antennæ with the basal joint long, slightly thickened with appressed scales above; white, with minute blackish dots above. *Palpi* recurved, terminal and median joints of about equal length, the latter clothed with a rather long tuft of projecting scales; white, speckled with black; the terminal joint smooth, with three blackish annulations, the apex blackish. *Head* white, profusely speckled with black at the ends of the broad flattened scales. *Thorax* white, speckled with black, assuming the form of minute strigæ on the tegulae. *Fore-wings* white, speckled with black, assuming the form of minute strigæ in a short series at the base of the costa; a second series from the base along the cell to about one-sixth, thence the remainder of the wing, nearly to the apex, is more or less profusely speckled with greyish fuscous having a tendency to run in transverse strigulae; a slight shade on the middle of the costa is succeeded by a transverse shade-band at three-fourths, beyond which the acute apex of the wing is narrowly outlined with brownish ochreous bearing a reduplicated minute brownish ochreous oblique streaklet at the commencement of the costal cilia and another beyond it on the dorsum, a slender blackish line points to the apex in the intermediate space; cilia at the apex white, freely speckled with minute black scale-points, the cilia about the tornus greyish cinereous. *Exp. al.* 10 mm. *Hind-wings* and cilia greyish cinereous; the wings rather shining. *Abdomen* with an ochreous tinge

on the basal half, whitish posteriorly ; with an expansible hair-pencil posteriorly. *Legs* smooth, whitish, speckled with black externally.

Type ♂ (13376) Mus. Wlsm.

Sokotra : Hadibu Plain (21. II. 99).—Unique.

Scythris, Hb.

8. *Scythris denticolor*, Wlsm. (Plate xxi. fig. 7.)

Scythris denticolor, Wlsm., Bull. Liverp. Muss., iii. p. 4 (1900).

Antennae dirty brownish white. *Palpi* whitish, with a slight brownish tint externally. *Head* and *Thorax* brownish white. *Fore-wings* whitish, with a faint brownish tinge except about the apex ; a small fuscous spot lies in the fold a little before the middle of the wing and another at the end of the cell ; cilia white at the apex, suffused with brownish ochreous towards the tornus. *Exp. al.* 16 mm. *Hind-wings* whitish grey, with some faint brown scaling towards the apex ; cilia light brownish ochreous. *Abdomen* whitish, shining silvery white beneath. *Legs* whitish.

Type ♀ (13377) Mus. Wlsm.

Sokotra : Hadibu Plain (11-12. XII. 98).—Two specimens.

9. *Scythris neurogramma*, Wlsm. (Plate xxi. fig. 8.)

Scythris neurogramma, Wlsm., Bull. Liverp. Muss., iii. p. 4. (1900).

Antennae greyish brown. *Palpi* smooth, recurved ; dirty whitish, shaded with greyish brown externally. *Head* and *Thorax* pale greyish brown, mixed with dirty whitish. *Fore-wings* dirty whitish, with greyish brown shading, usually broken into length-streaks corresponding to the spaces between the veins, separated by lines of the white ground-colour of variable width ; a narrow greyish brown line along the upper edge of the cell is recurved around the outer end of the cell, while above and beyond it is a series of very short greyish brown oblique streaks not reaching the costa, and more distinctly separated in the direction of the costa than towards the apex and termen, where they are somewhat densely crowded ; another narrow line follows the upper edge of the fold and the dorsal space below the fold is almost entirely suffused with pale greyish brown ; cilia greyish brown, with a slight ochreous tinge, giving them a brighter appearance than the wing-markings. *Exp. al.* 12 mm. *Hind-wings* brownish grey, the cilia as in the fore-wings. *Abdomen* greyish, anal tuft whitish cinereous. *Legs* dirty whitish.

Type ♂ (13379) Mus. Wlsm.

Sokotra : Hadibu Plain (11. XII. 98) ; Adho Dimellus (3,500 ft., 12. II. 99).

—Five specimens.

The wings of this species are somewhat narrow and very acutely pointed, and the markings assume the pattern so frequently represented in the genus *Coleophora*, Hb., especially in *troglobytella*, Dp., and its allies.

I have slight varieties of what appears to be the same species from Bathurst (Gambia).

10. *Scythris*, *sp.*

Scythris, *sp.* Wlsm., Bull. Liverp. Muss., iii. p. 5 (1900).

Sokotra : Hadibu Plain (15. XII. 98).—[Mus. Wlsm., 13375.]

A single specimen in poor condition, but distinct from those now described.

11. *Scythris* (?) *pectinicornis*, Wlsm. (Plate xxi. fig. 9.)

Scythris (?) *pectinicornis*, Wlsm., Bull. Liverp. Muss., iii. p. 5 (1900).

Antennae with a strong closely packed pecten on the basal joint ; biciliate in both sexes (♂ 1-1½, ♀ rather less) ; pale cinereous. *Palpi*, ♂ recurved to the level of the vertex, the terminal joint shorter than the median ; ♀ more slender and less recurved ; whitish cinereous. *Head* and *Thorax* whitish cinereous. *Fore-wings* whitish cinereous, profusely dusted with brownish grey scaling, evenly distributed throughout, except a little beyond the middle of the fold where it appears somewhat concentrated ; cilia whitish cinereous, becoming brownish ochreous about the tornus. *Exp. al.* ♂ 12, ♀ 11 mm. *Hind-wings* rosy grey ; cilia pale brownish ochreous. *Abdomen* whitish cinereous. *Legs*, hind tibiae pale brownish ochreous, hind tarsi whitish cinereous.

Type ♂ (13383) ; ♀ (13382) Mus. Wlsm.

Sokotra : Hadibu Plain (15. XII. 98).—Two specimens.

This species, which might easily be confused with *neurogramma*, Wlsm., agrees with *Scythris* in neuration and in all other respects, except in the ciliation of the antennae ; but with such insufficient material before me I shall not venture to make it the type of a new genus.

Genostele, *Wlsm.*

Genostele, Wlsm., Bull. Liverp. Muss., iii. p. 5 (1900).

(*γένος* = a race ; *στέλη* = a guide post.)

Type Genostele reniger, Wlsm. (Plate xxi. fig. 11.)

Antennae (♀) ¾, simple, tending to slight serrations before the apex.

Ocelli absent. *Maxillary Palpi* well-developed ; porrect, inflected.

Labial Palpi long, recurved, the median joint slightly roughened towards the apex ; terminal joint scarcely shorter than the median, slender acute. *Head* and face clothed with loose scales. *Thorax* smooth. *Fore-wings* four times as long as broad, elongate, costa slightly arched, the apex depressed, rounded, termen oblique. *Neuration*, 11 veins, (7 and 8 coincident) to costa ; the other veins separate. *Hind-wings* not broader than the fore-wings, somewhat rounded at the apex, not emarginate. *Neuration*, 8 veins ; 3 and 4 almost connate, 6 and 7 separate and almost parallel, 6 about equidistant from 5 and 7.

Abdomen normal. *Legs*, hind tibiae somewhat hairy above.

This genus differs from *Cerostoma*, Ltr., in the separation of veins 6 and 7 of the hind-wings and from *Plutella*, Schrk., in the remoteness of

vein 6 from 5 as also in the coincidence of veins 7 and 8 of the fore-wings, but in general appearance and structure its affinity would be to these genera. The genus *Ancylometis*, Meyr., from Mauritius appears to approach *Genostele* in some respects, particularly in the coincidence of veins 7 and 8 of the fore-wings, but if Meyrick is correct in describing it as having vein 5 of the hind-wings approximated to, or coincident with 4, it must be regarded as sufficiently distinct.

12. *Genostele reniger*, Wlsm. (Plate xxi. figs. 10-11.)

Genostele reniger, Wlsm., Bull. Liverp. Muss., iii. p. 6 (1900).

Antennae pale stone-ochreous, annulate with fuscous. *Palpi* with the median joint thickened with appressed scales which are somewhat loosened towards its apex beneath, pale stone-ochreous, profusely speckled with brownish fuscous; the terminal joint slender, similarly coloured. *Head* pale stone-ochreous, with a brownish fuscous streak along its middle above, this is continued through the anterior half of the pale stone-ochreous *Thorax* on which are also two parallel lateral dark fuscous streaks. *Fore-wings* pale stone-ochreous, speckled with brownish fuscous, a narrow dark fuscous streak along the base of the costa, with another beneath it, parallel to the limbus, but not extending beyond the flexus; at the base of the cell is an elongate reniform patch, outlined with dark fuscous, extended to about one-fifth and touching at its outer extremity the transverse reniform patch, which covering the whole width of the cell, extends downwards across the fold nearly to the dorsum; this is separated from a third reniform patch, occupying the end of the cell and extending a little below it; these patches are all narrowly outlined with dark fuscous (and from indications afforded by a second specimen—presumably of the same species—will be found in some varieties to be more or less strongly filled in with dark brownish fuscous); above the outer patch is a dark fuscous costal shade before the commencement of the cilia; a group of dark fuscous scales also occurring before the apex midway between the costa and termen, and accompanied by some profusion of brownish fuscous speckling which extends along the termen and is strongly repeated throughout the pale stone-ochreous terminal and apical cilia. *Exp. al.* 19 mm. *Hind-wings* greyish; cilia pale brownish cinereous. *Abdomen* brownish ochreous. *Legs* pale brownish cinereous, the tarsi speckled with brownish scales.

Type ♀ (13368) Mus. Wlsm.

Sokotra: Adho Dimellus (3500 ft., 2-3. II. 99.)—Two specimens, both ♀.

Prays, Hb.

13. *Prays* (?), sp.

Prays (?), sp. Wlsm., Bull. Liverp. Muss., iii. p. 6 (1900).

Sokotra: Adho Dimellus (3500 ft., 11. II. 99.)—[Mus. Wlsm. 13370.]

A single specimen of what appears to be a species of *Prays*, allied to *citri*, Mill., in damaged condition, having evidently been taken with the assistance of oil and fire.

Mieza, Wkr.

14. *Mieza* (?) *inornata*, Wlsm. (Plate xxi. fig. 12.)

Mieza (?) *inornata*, Wlsm., Bull. Liverp. Muss., iii. p. 6 (1900).

Antennæ fusco-cinereous. *Palpi* porrect, slender; hoary whitish, with some fuscous scales externally. *Head* and *Thorax* dirty whitish. *Fore-wings* dull greyish white, the veins and cell narrowly marked out by lines of brownish grey, the costa and the dorsum beneath the fold slightly suffused with the same; cilia hoary whitish, sprinkled with brownish grey atoms. *Exp. al.* 12 mm. *Hind-wings* dirty whitish cinereous; cilia whitish cinereous. *Abdomen* brownish grey. *Legs* whitish cinereous; the tarsi slightly shaded.

Type ♀ (13374) Mus. Wlsm.

Sokotra: Hadibu Plain (II. XII. 98).—Unique.

In the hind-wings veins 3 and 4 are stalked, in which respect some divergence is shown from the typical neurulation of *Mieza*.

TORTRICIDÆ.

OLETHREUTINÆ.

***Cryptophlebia*, Wlsm.**

Cryptophlebia, Wlsm. Ind. Mus. Notes iv., 105 (1899).

15. *Cryptophlebia* (?) *socotrensis*, Wlsm. (Plate xxi. fig. 13.)

Cryptophlebia socotrensis, Wlsm., Bull. Liverp. Muss., iii. p. 6 (1900).

Antennæ greyish fuscous, the basal joint tawny reddish. *Palpi* conical, extending more than the length of the head beyond it; tawny reddish, the apex of the terminal joint slightly fuscous. *Head* and *Thorax* tawny reddish, the latter slightly tufted posteriorly. *Fore-wings* tawny reddish, with closely packed transverse wavy lines of sericeous mottling arising from the costa and traversing the whole width of the wing, leaving a faint indication of two tawny reddish spots at the outer angles of the cell; the extreme base only appears to be free from these sericeous wave-lines, and the extreme edge of the costa is very narrowly touched with ochreous [what remains of the cilia is tawny reddish]; the underside is tinged with ochreous throughout, and shows a faint indication of greyish fuscous mottling, especially around the costa and termen. *Exp. al.* 22 mm. *Hind-wings* brownish fuscous, cilia slightly paler; underside with a faint indication of greyish fuscous mottling especially around the costa and termen. *Abdomen* brownish fuscous. *Legs* pale greyish ochreous, the hind tarsi transversely shaded with brownish fuscous.

Type ♀ (13371) Mus. Wlsm.

Sokotra : Adho Dimellus (3500 ft., 12. II. 99).—Unique.

In the absence of the ♂ it is impossible to determine whether this species belongs to the genus *Cryptophlebia* or to an undescribed genus occurring in Africa and Australia to which **Arotrophora ombrodella*, Lower and Froggatt, belongs. The larva will probably be found to be attached to *Leguminosae*, presumably to some species of *Acacia*.

16. *gen. ? sp. ?*

Sokotra : Under Alilo in the Dinehan Valley (1500 ft., 2 II. 99).—[Mus. Wlsm. 13387.]

A single ♀ in very poor condition, belonging to the group of *Crociosema*, Z., and *Rhopobota*, Ld., cannot be generically identified in the absence of the ♂.

TORTRICINÆ.

Oxygrapha, *Hb.*

17. *Oxygrapha*, *sp.*

Teras, sp., Dixey, Pr.Z. Soc. Lond., 1898, 383.

An undetermined species was collected by Mr. Bennett.

Archips, *Hb.*

18. *Archips* (?) *socotranus*, *Wlsm.* (Plate xxi. figs. 14-15.)

Archips (?) *socotranus*, Wlsm., Bull. Liverp. Mus., iii. p. 7 (1900).

Antennæ cinereous, shaded with brown (or testaceous). *Palpi* porrect, conical, stretching twice the length of the head beyond it, thickly clothed above with appressed scales ; dark rust-brown (or testaceous). *Head* rust-brown (or testaceous). *Thorax* fawn-brown (or testaceous). *Fore wings* fawn-brown (or brownish testaceous), with a faint indication of a darker reddish (or testaceous) oblique fascia from before the middle of the costa, and an ante-apical costal patch, [in the darker of the two specimens (13373) there is a slight outline of a basal patch—in the ♂ these markings may be expected to assume a more pronounced appearance]; the surface of the wing is somewhat shining, and thickly speckled with scarcely darker spots in transverse sinuate lines (visible only with the light striking the wings at a suitable angle); cilia along their base chestnut brown, except around the tornus, greyish cinereous on their outer half and at the tornus; faintly reticulated along the costa and around the termen on the underside. *Exp. al.* 22-23 mm. *Hind-wings* somewhat incised below the apex and near the flexus; shining brownish grey, strongly iridescent towards the base and paler in the costal than in the dorsal region, a slight reticulation of darker scales about the apex and on the base of the cilia around it; cilia pale shining brownish grey; underside faintly reticulated along the costa and around the termen. *Abdomen* shining greyish ochreous (or pale brownish grey). *Legs* shining, pale brownish cinereous.

Type [=Cotypes ♀ ♀ (13372-3)] Mus. Wlsm.

Sokotra : Adho Dimellus (3500 ft. 11-12. II. 99).—Two specimens.

Two ♀ ♀ showing some diversity of colour, but obviously belonging to the same species which appears to be related to *lafauryanus*, Rag., but to differ in the somewhat more rounded costa towards the base and in the more sericeous appearance of the wing-texture. In the absence of the ♂ this cannot be referred with certainty to the genus *Archips*.

TINEIDÆ.

Acrocercops, *Wlgrn.*

19. *Acrocercops* *sp.*

Sokotra : Haggier Range (II. 99).—[Mus. Wlsm.]

I am indebted to Dr. Rebel for a specimen of a small obscure species of this genus collected by Professor Simony, a member of the Austrian Expedition to Sokotra under the auspices of the Imperial Academy of Sciences in Vienna, in 1899.

Micros from Abd-el-Kuri.

PYRALIDINA.

PTEROPHORIDÆ.

Trichoptilus, Wlsm.

1. *Trichoptilus oxydactilus*, Wkr.

(See p. 344.)

Ab-el-Kuri (1-3 XII. 98).

Agdistis, Hb.

2. *Agdistis minima*, Wlsm. (Plate xxi. fig. 1.)

Agdistis minima, Wlsm., Bull. Liverp. Mus., iii. p. 1 (1900).

Antennæ brownish cinereous. *Palpi* very short, closely appressed to the face, the terminal joint scarcely visible at the end of the rather thickly clothed median joint; whitish cinereous. *Head* and *Thorax* whitish cinereous. *Fore-wings* whitish cinereous, thickly dusted with blackish scales along the costal and dorsal thirds, on the costa before the apex are three slight aggregations of the black scaling forming scarcely noticeable costal spots; the usual elongate semi-transparent triangle reaches to within one-third of the base, and is brightly iridescent; cilia whitish cinereous, speckled with black scales along their base. *Exp. al.* 12-14 mm. *Hind wings* with a noticeable elongate mat of black scales near the base on the underside, terminating in a comb of separate black hair-scales along the lower margin of the cell; brownish grey, much speckled with black scaling along the dorsum, slightly iridescent towards the costa; cilia whitish cinereous. *Abdomen* whitish cinereous. *Legs* whitish, profusely sprinkled with minute black scale-points.

Type ♂ (13358) Mus. Wlsm.

Abd-el-Kuri Id. (1-3. XII. 98).—Two specimens.

This is the smallest known species of *Agdistis* and differs very considerably in its paler colouring from those European species which tend to approach it in size.

PLATE XXI.

- Fig. 1. AGDISTIS MINIMA, *Wlsm.* Type ♂, p. 354.
- Fig. 2. ONEBALA SIMPLEX, *Wlsm.* Type ♂, p. 344.
- Fig. 3. HYP SOLOPHUS GRANTI, *Wlsm.* Type ♂, p. 345.
- Fig. 4. HYP SOLOPHUS THORACELLUS, *Wlsm.* Type ♀, p. 346.
- Fig. 5. GELECHIA SARCOCHROMA, *Wlsm.* Type ♂, p. 346.
- Fig. 6. BATRACHEDRA ATOMOSELLA, *Wlsm.* Type ♂, p. 347.
- Fig. 7. SCYTHRIS DENTICOLOR, *Wlsm.* Type ♀, p. 348.
- Fig. 8. SCYTHRIS NEUROGRAMMA, *Wlsm.* Type ♂, p. 348.
- Fig. 9. SCYTHRIS (?) PECTINICORNIS, *Wlsm.* Type ♂, p. 349.
- Fig. 10. GENOSTELE RENIGER, *Wlsm.* Type ♀, p. 350.
- Fig. 11. GENOSTELE, *Wlsm.* : neuration and head, p. 349.
- Fig. 12. MIEZA (?) INORNATA, *Wlsm.* Type ♀, p. 351.
- Fig. 13. CRYPTOPHLEBIA (?) SOCOTRENSIS, *Wlsm.* Type ♀,
p. 351.
- Fig. 14. ARCHIPS (?) SOCOTRANUS, *Wlsm.* Co-type ($\frac{1}{2}$) ♀, p. 352.
- Fig. 15. ARCHIPS (?) SOCOTRANUS, *Wlsm.* Co-type ($\frac{2}{2}$) ♀, p. 352.

[Figs. 1-10, 12-15 F. W. Frohawk, delt. ; Fig. 11, J. Hartley Durrant, delt.]



1.



2.



3.



4.



5.



6.



7.



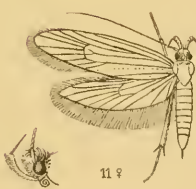
8.



9.



10.



11 ♀



12.



13.



14.



15

F.W. Frohawk del. [Fig. 11 & 12 R. Durrant del.]

F.W.M. Trap Chromo

A.J. Wendell lith

ARTHROPODA.

Insecta:
Diptera.

By GERTRUDE RICARDO.

Culicidae By F. V. THEOBALD, M.A.

PLATE XXII.

Flies.

In this small collection of *Diptera* from Sokotra and Abd-el-Kuri, nine species appear to be new to science, and of those identified with certainty, two are identical with European species, three with South African, one with a West African, and six with species which have been met with in the neighbourhood of Aden and the Red Sea.

I am much indebted to Colonel Yerbury for his kind assistance and suggestions in the identification of many of the species, and without his help this list would have been even more incomplete than it is. I regret it has not been possible to work out the *Muscidæ* more thoroughly; this family requires an expert's knowledge.—*G. R.*

I.—The Flies of Sokotra.

TIPULIDÆ.

Tipula, Linn.

1. *Tipula*, *sp.*

Sokotra : 1 ♂, 2 ♀, Adho Dimellus (3500 ft., 10. II. 99).—A pair taken *in coitu*; and 1 ♀.

Limnobia, Meig.

2. *Limnobia*, *sp.*

Sokotra : 1 ♂, Adho Dimellus (3500 ft., 15. II. 99).

[Crane-flies appear to be extremely rare in Sokotra. The specimens taken were almost the only ones seen.—*W.R.O.G.*]

MYCETOPHILIDÆ.

Sciara, Meig.

3. *Sciara*, *sp.*

Sokotra : Adho Dimellus (3500 ft., 3. II. 99).—One specimen.

CULICIDÆ.*

Stegomyia, Theob.

Female palpi short, male palpi long, as in *Culex*. Venation as in *Culex*.

* By F. V. Theobald, M.A.

Head clothed entirely with flat broad scales and upright forked ones ; no trace of narrow curved scales ; the head thus resembling that of *Megarhina* ; meso-thorax with narrow curved or spindle-shaped scales ; the scutellum with broad flat scales like the head ; meta-notum nude.

This genus contains a number of closely related species, which were formerly included in the genus *Culex*, but from which they differ in regard to the scale structure of the head and scutellum ; the greater part of the head of *Culex* is covered with narrow curved scales, as also is the scutellum, whilst in this genus these two parts are completely covered by flat scales, giving them a very marked appearance. The Type of the genus is *Culex taeniatus*, Wied. The larvae apparently have a short thick respiratory siphon.

4. *Stegomyia granti*, Theob. (Plate xxii. fig. 6.)

Stegomyia grantii, Theob., Mon. Culicidæ, B.M., p. 306, pl. xiv. fig. 55 (1901).

Thorax chestnut-brown ; meso-thorax with a narrow median line of white scales forked in front of the scutellum, then a fine curved lateral pair, and another pure white line below on each side. Abdomen black with well-defined narrow basal white bands, which bend obliquely and form a straight oblique white line on each side of the segments. Venter white scaled. Legs black with fine pure-white lines and white basal bands to the hind tarsi ; bases of some of the fore- and mid-tarsi pale.

♀ Head black with two median lines of white scales meeting in a point in front, expanding backwards, border of the eyes white-scaled and a line of pure white scales between the eyes ; eyes silvery ; antennæ brown with pale bands, basal joint black with a border of pure white scales, base of second joint reddish-brown ; palpi covered with black and white scales, the tip being white scaled. Thorax bright chestnut-brown, covered with very fine scales, almost like little hairs ; a thin but very distinct median line of white scales which forks round a bare space just in front of the scutellum, a fine curved line on each side, starting from the side of the meso-thorax near the head, and about the middle bending in and running down the dorsum of the mesothorax to the scutellum, there is also another lateral white line below on each side ; scutellum chestnut-brown bordered with white scales and black bristles ; metanotum chestnut-brown ; pleuræ chestnut-brown with white scales.

Abdomen covered with dusky brown scales, showing a dull purplish tinge, and a few traces of ochraceous coloration in some lights, each segment with a narrow but very distinct basal band of white scales, which turns off at an obtuse angle on each side forming a straight lateral oblique line on each side of the segments ; on the last two segments the white scales of the venter come up as a narrow line and join the oblique lateral stripes ; posterior borders of the segments edged with pale golden hairs. Legs black with white lines and bands as follows :—

Fore-femora and tibiae with three white lines of scales running the whole length, one ventral, the other two lateral ; base of fore-metatarsus white,

also with white lines; tarsi black, slightly pale at the base owing to the absence of scales; mid-legs very similar, but the bases of the first two tarsal joints rather more distinctly pale; hind-legs with the base of the femora quite pale, and the bases of the first and second tarsi broadly banded with white; last two tarsal joints lost. Ungues of the fore and mid legs small, equal, and simple. Wings with rather long narrow brown scales on the veins; first submarginal cell very little narrower or longer than the second posterior cell, the stem of the latter only about half the length of the cell; posterior cross-vein about $1\frac{1}{2}$ times its own length distant from the mid cross-vein.

Length 5 mm. (not including proboscis).

Sokotra.—*Time of capture*, December.

Observations.—Described from a single ♀ specimen brought back from Sokotra, where Mr. Grant tells me it is very troublesome. It resembles in a most striking manner *C. spathipalpis*, Rond., the thorax and head being similarly marked, but the peculiar abdominal banding, the perfect white lines on the black legs, the posterior cross-vein being close to the mid cross-vein and smaller, and the entire absence of wing spots separate it at sight; moreover, owing to the head and scutellar scales being flat, it is clearly separated from *C. spathipalpis*, and comes into my new genus *Stegomyia*.

[In addition to the above there were at least two other species of mosquito that attacked us in Sokotra. I was, unfortunately, unaware at the time of the interest attaching to these flies, and, being much occupied with other branches of zoology, did not preserve a series, which I greatly regret.—*H.R.O.G.*]

THEREVIDÆ.

Psilocephala, Zett.

5. *Psilocephala albohirta*, n. sp. (Plate xxii. figs. 5, 5a.)

Type ♂. Black with white pubescence. Face naked. Fourth posterior cell of wing closed.

Face with white tomentum, forehead dull black with a little tomentum in the centre of the lower half. Antennæ with the first joint shortly cylindrical, black, clothed with black hairs, the second short and round, bright red, with a few black hairs at the sides, the third long, as wide as the second at the base, gradually tapering to a point, bright red, black at apex. Palpi black, with long white hairs. Beard white. Eyes contiguous. Hind-part of the head with short black pubescence. Thorax dull black, with scattered fulvous pubescence on the dorsum and sides. Breast clothed with white hairs. Scutellum with a fringe of white hairs on its outer margin. Abdomen with white hairs on the posterior margins of all the segments, and on the whole width of the segments at the sides; genital organs red, the underside of abdomen with a few scattered

white hairs. Legs black, the coxæ, the apex of the femora, the basal half of the tibiæ and of the tarsi reddish-brown, the femora with white pubescence, longest on the anterior pair, the pubescence on the tibiæ and tarsi black. Wings clear, grey, veins brown, the cross veins with very slight shading, the fourth posterior and anal cell closed.

Length $9\frac{1}{2}$ mm.

Sokotra: Homhil (2500 ft., 26. I. 99).—Two specimens.

[Both were obtained on a dry stony path near the top of the limestone range at Homhil. The species appeared to be both local and rare.—*H.R.O.G.*]

ASILIDÆ.

Hoplistomera, *Macq.*

6. *Hoplistomera nigrescens*, *n. sp.* (Plate xxii. figs. 11, 11a.)

Type ♀. Blackish. The hind femora with no spines on the underside, but some weak yellow bristles. The last segment of abdomen red, the antennæ and legs black.

Face shining black, the moustache consists of long white hairs extending to the antennæ; palpi black, with black hairs. Antennæ with white hairs on the first two joints, and some long black bristle-like hairs on their undersides. Hind part of head with white hairs, and some black bristles in the centre. Thorax with sparse fulvous tomentum, and some white hairs chiefly on the sides and posterior part. Breast sides with greyish tomentum and scanty white pubescence. Abdomen almost blue-black, with the extreme posterior margins of segments fawn coloured, the last segment almost wholly red; the pubescence black, white at the sides and on the posterior margins. Legs black, with yellow bristles, some black ones on the hind tarsi; pubescence white, the tibiæ and tarsi sometimes reddish brown. Wings clear, veins reddish brown, the small cross vein below the middle of the discal cell.

Length 10 mm.

Sokotra: Hadibu Plain (11. XII. 98).—Two specimens.

Promachus, *Loew.*

7. *Promachus sokotræ*, *n. sp.* (Plate xxii. figs. 7, 7a, ♂, figs. 9, 9a, ♀.)

Type ♂, Adho Dimellus; Type ♀, Adho Dimellus. Allied to *P. rectangularis* and *P. rueppelli*, Loew (*Neue Beitr.* ii. p. 5), from Massowah, but easily distinguished from both by the dark colour of the legs—from the former by the black bristles on the scutellum, and from the latter by the quite clear wings. Grey, with black bands on the abdomen, black legs and clear wings.

Face grey with white tomentum, the moustache composed of long white hairs below and large yellow bristles above, with six or more stout black bristles above these, in two of the ♂ specimens these last bristles

are reduced to one or two ; long white hairs are continued up each side to the antennæ. Beard white. Palpi black, with long white hairs on the basal half and stout black bristles on the apex. Antennæ brown with short black bristles on the sides of the first two joints. Forehead brown, with white pubescence and black bristles. Hind-part of the head with white hairs and black bristles. Thorax brown, the central stripe black, the side ones less distinct and brownish, with black pubescence, fulvous tomentum and black bristles ; there are a few white hairs on the posterior sides. Scutellum greyish, with white hairs, and black bristles on the margin. The breast sides are brown with fulvous tomentum and white pubescence. Abdomen with broad black bands on the second to the seventh segments, which only leave the ground colour free on the posterior borders and sides, and have rounded hind-corners ; the eighth segment is wholly black, with a prolongation beneath bearing a tuft of black and white hairs ; the genital organs are long and stout with a tuft of white hairs above at their base, ending in long black hairs at their tips, and with black pubescence ; the pubescence and bristles on the abdomen are black on the dorsum and yellow on the sides and underneath. Legs black, the pubescence is white on the inner side of the femora, the hind tibia and metatarsus, on the upper side of the anterior and middle tibiæ, and on the four last joints of the fore-tarsi, where it is long and very distinct ; on the inner side of the fore-tibia there is short dense fulvous pubescence ; elsewhere black, with all bristles black. Wings clear, veins reddish-brown.

Length 24 mm.

The ♀ is identical, but the white hairs on the fore-tarsi are not so distinct and thick ; the eighth segment of the abdomen is black and shining.

Sokotra : Adho Dimellus, 4 ♂, 5 ♀ (3500 ft., 4.-12. II. 99) ; Goahal Gorge, 3 ♀ (200 ft., 16.-27. I. 99).

[This large predacious fly was fairly common on the middle and higher ranges, especially among the granite peaks of the Haghier range in the neighbourhood of Adho Dimellus. It frequents the neighbourhood of the rough hill paths, settling on the stones. As a rule, it is extremely alert and not very easy to net, but while engaged in devouring its prey may sometimes be boxed. There is a very large male in the collection, taken in the act of killing a cicad. It was so much engaged in this pleasant occupation that it allowed me to place the muzzle of a .410 gun on its back and gently squeeze it to death.—*H.R.O.G.*]

Machimus, Loew.

8. Machimus, *sp.*

Sokotra : Jena-agahan, ♂ (4. I. 99) ; Adho Dimellus, ♂ (3500 ft., 15. II. 99).

9. Machimus, *sp.*

Sokotra : Homhil, 1 ♂ (2500 ft., 22. I. 99).

Itamus, Loew.**10. Itamus, sp.**

Sokotra: Hadibu Plain, ♂ ♀ (12. XII. 98); Homhil, 4 ♀ (1500-2500 ft., 19-25. I. 99).

BOMBYLIDÆ.**Exoprosopa, Macq.****11. Exoprosopa punctipennis, n. sp.** (Plate xxii. figs. 1, 1a, ♂.)

This and the following species are similar to *Exoprosopa schmitti*, Karsch (*Berlin Ent. Zeit.*, xxxi. p. 372), in having the branch vein the reverse way to that of the species described by Loew in Div. II. (*Dipt. Südafrik.*, p. 241), viz., running into the discoidal cell instead of into the third posterior cell.

Type ♂, Adho Dimellus; Type ♀, Hadibu Plain. Black, with white bands on the sides of the thorax and on the abdomen; scutellum dull red.

Face brown, with black pubescence and glittering white pile. Antennae brown, the first joint bright red, the first two joints with black hairs, the bristle reddish, stout, and shorter than the third joint. Proboscis longer than the head. Hind-part of head with white pile bordering the eyes. Collar composed of yellow hairs above, and black below: the pubescence at sides of thorax and on breast black. Thorax with a well-marked stripe of white hairs on each side, extending to base of scutellum, pubescence on dorsum black with scattered white pile. Scutellum dull red, black at the base, the pubescence black with white pile on margin. Abdomen wholly black, pubescence black, on the anterior borders of second, third, fifth, sixth, and seventh segments a fringe of whitish-yellow pile, broadest at the sides; on the fifth segment the band is of the same width throughout and quite white; the hairs on the sides of abdomen are white on the first segment and on the anterior border of the second segment, black on the others; the underside is black, reddish in the centre, with rather thick black pubescence. Legs black, with black pubescence and bristles. Wings brown on the fore-border, clear on the posterior part, with the cross veins shaded; the dark shading on the fore-border extends at the extreme base to the posterior border of wing, from there it reaches half-way up the second basal cell, wholly through the first basal cell just into the first posterior cell, and half-way up the second sub-marginal cell; from there it is bounded by the second longitudinal vein as far as the cross vein, from whence it runs to the junction of the first longitudinal vein in the border, leaving the apex of the marginal cell nearly wholly clear, but joining the second longitudinal vein again when it reaches the border; the spots on the cross veins are as follows: One each at the base of the first and second sub-marginal cells, one on the upper part of the discoidal cell extending as far as the angle, and one each

at the base of the third and fourth posterior cells; the branch emitted into the discoidal cell is just below the cross vein; the first posterior cell is only slightly narrowed, the second slightly wider than the third, and the fourth twice as broad as the second.

Length $14\frac{1}{2}$ mm.

Sokotra: Hombil (2500 ft., 19-22. I. 99); Adho Dimellus (3000 ft., 7-9. II. 99); Hadibu Plain (14. XII. 98).—3 ♂, 5 ♀ obtained.

[This handsome species was common on the middle and higher ranges of both the granite and limestone ranges. Like the rest of its kind, it was generally met with on the dry, stony paths. It was especially common in the neighbourhood of Hombil at an elevation of about 2500 feet.—*W.R.O.G.*]

12. *Exoprosopa insularis*, *n. sp.* (Plate xxii. figs. 3, 3a.)

Type ♂. Black, with bands of yellow and white pubescence on the abdomen.

Face black, yellow round the mouth, with black pubescence and white and yellow pile. Antennæ brown, the first joint red, the first two joints with black hairs, the bristle stout, not half as long as the third joint. Hind-part of head with yellow pubescence. The collar is composed of yellow hairs. Sides of thorax with yellow pubescence, below the halteres with orange hairs, and yellow and black hairs on the breast. Thorax and scutellum clothed with black pubescence and yellow and white pile. Abdomen with a fringe of yellow hairs extending across the middle of the first segment and reaching the sides, on the anterior borders of second and third segments a fringe of white pile, broadest on the third, on the anterior borders of the three last segments a fringe of yellow pile; on the sides of first, second, and anterior border of third segment are yellow hairs, on the succeeding ones a thick fringe of black hairs; underside of abdomen black, with scattered yellow hairs and yellow pile. Legs black, with black pubescence, thickest on the anterior femora, bristles black. Wings dark brown, in the arrangement of the shading very similar to those of *Exoprosopa venus*, Wied. (see Loew, *Dipt. Südafrik*, tab. II. fig. 41); the cells on the posterior border are clear, but all the longitudinal veins have dark shading, besides the cross veins; there is a clear spot in the apex of the second basal cell, and in the centre of the discoidal cell, and the second posterior cell is clear; the branch emitted into the discoidal cell just below the cross vein is very short; the first posterior cell is narrowed, the other posterior cells about equal in width.

Length $11\frac{1}{2}$ mm.

Allied to *E. disrupta*, Walker, Ent., v. p. 255, 1871, from Hor Tamanib, near to Suakim on Red Sea, but easily distinguished from it by its black legs and scutellum, and by the lower branch of the third longitudinal vein being shaded like the rest, not clear as in Walker's type in the British Museum collection.

Sokotra: Jena-agahan, 1 ♂ (1200 ft., 7. I. 99).

[This extremely handsome species was met with in the middle granite hills of the Haghier range. I tried hard to procure more examples, but never came across a second specimen.—*W.R.O.G.*]

Argyromœba, Schiner.

13. *Argyromœba fuscipennis*, *n. sp.* (Plate xxii. figs. 2, 2a.)

Type ♀, Adho Dimellus. Black, with bands of white pile on the abdomen.

Face clothed with black hairs and some whitish pile. Antennæ with the third joint grey on the upper part, the first and second both with black pubescence, the third broader than the second with a rim-like base, the upper part narrower, subconical, with a two-jointed bristle as long as the second and third joints together, its second joint shorter than the first, with bristles at the tip. Collar composed of black hairs. The sides of the thorax and the breast with black pubescence, the dorsum of the thorax with the same and some scanty white pile. Abdomen with a bunch of white hairs on the sides of the first segment, black hairs on the remaining ones; on the anterior borders of the second and following segments are narrow bands of white pile, most distinct on the second, becoming narrower as they reach the centre; the pubescence consists of long black hairs, thickest on the apex of abdomen, the underside clothed with black pubescence. Legs with black hairs and bristles and white pubescence on the femora and tibiae. Wings with dark brown shading at the base and on the fore-border, at the base it does not quite reach the posterior border, extends across the basal half of the anal cell and the base of the discal cell to the fore-border, reaching the junction of the first longitudinal vein in the border; opposite the junction of the second longitudinal with the third it extends across as a narrow band, encircling the small cross vein, and just reaching into the discal cell, the rest of its length along the fore-border is bounded by the first longitudinal vein; there is a large clear spot in the apex of the second basal cell; appendix present on the base of the second longitudinal and on the branch of the third longitudinal vein, the angle on the above branch being rather acute, veins brown.

Length 10 mm.

Sokotra: 3 ♀, Adho Dimellus (3000 ft., 17.-18. II. 99); Hadibu Plain (30. I. 99).

[Apparently a rare species. I first obtained a single example on the east of the Hadibu Plain at almost sea-level on the 30th January, and subsequently caught two more at Adho Dimellus at an elevation of 3500 feet on the 17th and 18th February.—*W.R.O.G.*]

Anthrax, Scop.**14. Anthrax sokotræ, n. sp.** (Plate xxii. figs. 4, 4a.)

This species might almost be included in the genus *Aphæbantus* formed by Loew for a North American species (see *Centur.*, x. No. 39, 1872, and Osten Sacken, *Biolog. Centr. Am.*, i. p. 143), but the eyes of these males are not contiguous as in those of *Aphæbantus*, so that for the present it must remain under *Anthrax* in Div. I.A of Loew (*Dipt. Südafrik*). The wing is very similar to that of *Anthrax fulvipes*, Loew (*Dipt. Südafrik*, tab. ii. fig. 14).

Type ♂, Adho Dimellus. Black, with yellow hairs, and the sides of the abdomen red.

Face black, yellowish round the mouth, with long black hairs on the upper part extending just below the antennæ, and bright red hairs round and above the oval aperture; some grey tomentum on the face. Antennæ with the first two joints short, the third onion-shaped, with a long styliform prolongation ending in a short joint with a bristle, the first two joints with long black hairs. Eyes separated in male. Hind-part of head with some short fulvous pubescence in the centre, and long black hairs at the sides. Collar composed entirely of light yellow hairs. The pubescence at the sides of the thorax and on the breast of the same colour; there are three or four black bristles on the upper side above the yellow hairs in the centre. Thorax and scutellum covered with yellow tomentum, the bristles black. Abdomen with a central black dorsal stripe, the sides being bright red, the first segment is covered with bright yellow hairs, the hairs on the sides of the other segments are black, and the pubescence on the dorsum is black, with yellow tomentum; the underside is red with yellow pubescence and tomentum. Legs red, with black bristles and pubescence, pulvilli distinct. Wings hyaline, with a faint yellow tinge on the fore-border extending into the second basal cell and above the junction of the second and third longitudinal veins; there is a grey spot in the apex of the second basal cell; the bifurcation of the second and third longitudinal vein is some distance below the cross vein; the branch of the third vein has the rudiment of an appendix, not always present; posterior and anal cells open, veins brown.

Length 12 mm.

Type ♀, Homhil, is identical, but the red on the abdomen is not so prominent, and on the underside there is a narrow black dorsal stripe.

Sokotra: 3 ♂, Adho Dimellus (3000 ft., 9. II. 99); Hadibu Plain (30. I. 99); Addah Valley, east of Hadibu Plain (29. I. 99); ♀, Homhil (1500 ft., 21. I. 99).

[This species was occasionally met with in the months of January and February from sea-level to an elevation of at least 3500 feet. It did not appear to be common.—*W.R.O.G.*]

15. Anthrax hottentotta, (Linn.).

Musca hottentotta, Linn., Faun. Suec., p. 441 (1761).

Nemotelus hottentottus, Degeer, Insect, vi. p. 190, Tab. 11, fig. 7 (1776).

Anthrax cingulata, Ahrens, Fauna Eur., iii. fig. 19 (1817).

Anthrax circumdata, Meig. Syst. Besch., ii. p. 143 (1820).

Anthrax hottentotta, Schiner, Fauna Austr., i. p. 51 (1863).

Sokotra: ♂, 9 ♀, Homhil (1500-2500 ft., 25. I. 99); Goahal Gorge (800 ft., 16. I. 99); Addah Valley, E. of Hadibu Plain (30. I. 99); Adho Dimellus (3000-3500 ft., 1-7. II. 99).

These seem identical with the European specimens, the only apparent difference being in the hairs of the face, which are scantier and *black*, not yellow, and have scantier golden pile.

[Common on dry paths. I am surprised that this species should prove to be *A. hottentotta*, with which I am well acquainted.—*H. R. O. G.*]

16. Anthrax, sp.

Sokotra: 4 ♀, Homhil (2500 ft., 22. I. 99); Abd-el-Kuri (9. XII. 98; 22. II. 99).

A black species with clear wings, of which I have not been able to find any description, so that it may possibly be undescribed.

Bombylius, Linn.**17. Bombylius, sp.**

Sokotra: 1 ♂, Adho Dimellus (3500 ft., 9. II. 99).

[Apparently rare; the only example seen during our stay in Sokotra is unfortunately in worn condition, and cannot be identified. It was hovering over a stream at the bottom of the deep valley to the south of our camp at Adho Dimellus.—*H. R. O. G.*]

Phthiria, Meig.**18. Phthiria, sp.**

Sokotra: 2 ♂, Hadibu Plain (12. XII. 98); Homhil (2000 ft., 19. I. 99).

SYRPHIDÆ.**Paragus, Latr.****19. Paragus serratus, Fabr.**

Paragus serratus, Fabr., Syst. Antl., p. 186 (1805); Wied., Auss. Zweifl. Ins., ii. p. 88 (1830); Verrall, Trans. Ent. Soc. Lond., 1898, p. 413.

These differ from the Indian species in the colouring of the thorax, which is bright metallic-blue, not black; the grey lines on the thorax in the ♂ are only present on the anterior part; in the ♀ they are altogether wanting.

Sokotra: 1 ♂, Hadibu Plain (13. XII. 98); 1 ♀, Jena-agahan (2500 ft., 13. I. 99).

[Apparently scarce.—*H. R. O. G.*]

Asarcina, Macq.**20. Asarcina ericetorum, (Fabr.).**

Syrphus ericetorum, Fabr., Spec. Ins., ii. p. 425 (1781).

Syrphus salviae, Fabr., Ent. Syst., iv. p. 306 (1794).

Scuera salviae, Fabr., Syst. Antl., p. 250 (1805).

Asarcina salviae, Loew, Dipt. Südafrik., p. 311 (1860); Verrall, Trans. Ent.

Soc. Lond., 1898, p. 414.

Sokotra: 2 ♂, Gebel Raggit (600 ft., 15. XII. 98); 1 ♀, Adho Dimellus (3800 ft., 5. II. 99).

[Fairly common all over the island.—*W.R.O.G.*]

Syrphus, Fabr.**21. Syrphus ægyptius, Wied.**

Syrphus ægyptius, Wied., Auss. Zweifl. Ins., ii. p. 133 (1830); Verrall, Trans. Ent. Soc. Lond., 1898, p. 414.

? *Scuera scutellaris*, Fabr., Syst. Antl., p. 252 (1805).

? *Syrphus splendens*, Dolesch., Nat. Tijds. Ned. Ind., x. p. 410, pl. i. fig. 3 (1856).

? *Syrphus javanus*, Wied., l.c. p. 131.

Sokotra: 2 ♂, Homhil (22. I. 99); Hadibu Plain (12. XII. 98).

[Common.—*W.R.O.G.*]

Melanostoma, Schiner.**22. Melanostoma gymnocera, Bigot.**

? *Melanostoma gymnocera*, Bigot, Ann. Soc. Ent. Fr., 1891, p. 375.

Sokotra: 3 ♂, Jena-agahan (1200 ft., 12. I. 99); Adho Dimellus (3500 ft., 10. II. 99); Homhil (2500 ft., 19. I. 99).

This may perhaps be the ♂ of the ♀ described by Bigot from Abyssinia, agreeing with his description of *M. gymnocera* except as regards the abdomen; in these specimens the spots on the second segment are oblong, not attaining the sides, nor meeting in the centre, the third segment is wholly yellow with the exception of a narrow band of black on the posterior margin, and the beginning of a black central line on the anterior margin, the fourth segment is yellow with only the posterior black band.

23. ? Melanostoma, sp.

Sokotra: ♀, Homhil (26. I. 99).

Eristalis, Latr.**24. Eristalis tæniops, Wied.**

Eristalis tæniops, Wied., Zool. Mag., ii. p. 42 (1818); Loew, Dipt. Südafrik., p. 324 (1860); Verrall, Tr. Ent. Soc. Lond., 1898, p. 415.

Eristalis torridus, Walker, List Dipt. B.M., iii. p. 612. (1849).

Eristalis ægyptius, Walker, l.c. p. 621.

Sokotra: 2 ♀, Dahamis (2000 ft., 21. XII. 98); and Jena-agahan (1200 ft., 5. I. 99).

[Appeared to be common in the middle range of the Haghier, but not afterwards observed.—*W.R.O.G.*]

Eumerus, Meig.

25. Eumerus obliquus (Fabr.).

Milesia obliqua, Fabr., Syst. Antl., p. 194 (1805).

Eumerus obliquus, Wied., Auss. Zweifl. Ins., ii. p. 112 (1830); Verrall, Tr. Ent. Soc. Lond., 1898, p. 422.

Eumerus ciliaris, Loew, Stett. Ent. Zeit., ix. p. 129 (1848).

This specimen agrees with Loew's description of the ♂, with the exception of the legs, which are lighter coloured, the anterior tibiæ and tarsi being almost wholly yellowish-brown and the posterior ones partly so; the forehead is coarsely punctated, and its pubescence entirely white.

Sokotra: 1 ♀, Homhil (2500 ft., 26. I. 99).

MUSCIDÆ.

Sarcophaga, Meig.

26. Sarcophaga africa, Wied.

Sarcophaga africa, Wied., Auss. Zweifl. Ins., ii. p. 356 (1830).

Sokotra: 3 ♀, Hadibu Plain (13. XII. 98); Jena-agahan (1200 ft., 9. I. 99); and Homhil (1500 ft., 18. I. 99).

The Type came from the Cape.

27. Sarcophaga, sp.

Sokotra: 1 ♂, 1 ♀, Hadibu Plain (12-14. XII. 98); 1 ♀, Homhil (2500 ft., 26. I. 99).

28. Sarcophaga hirtipes, Wied.

Sarcophaga hirtipes, Wied., Auss. Zweifl. Ins., ii. p. 361 (1830); Taschenb., Zeitsch. f. Naturw. Halle (4), ii. p. 182 (1883).

Sokotra: Wady Kischen.—(*Riebeck*).

Ocyptera, Latr.

29. Ocyptera, sp.

Sokotra: 2 ♀, Jena-agahan (1200 ft., 4-9. I. 99).

Allied to *O. atrata*, Fabr., which was found by Col. Yerbury at Aden.

Gonia, Meig.

30. Gonia ? nigra, Macq.

Gonia fasciata, Wied. (nec Meigen), Auss. Zweifl. Ins., ii. p. 344 (1830).

Gonia nigra, Macq., Dipt. exot., ii. p. 49 (1840); Suppl. iv. p. 177 (1850).

Sokotra: 2 ♀, Adho Dimellus (4000 ft., 16. II. 99); Dinehan Valley (3000 ft., 1. II. 99).

May perhaps belong to this species, the type of which came from the Cape.

[Only seen on the higher ground.—*W.R.O.G.*]

Melanophora, Meig.**31. *Melanophora*, sp.**

Allied to *M. atra*, Macq., and *M. roralis*, Linn.

Sokotra : Adho Dimellus (3500 ft., 15. II. 99).—Five specimens.

[These were all captured during very heavy rain at Adho Dimellus ; numbers would settle on the sheltered sides of the tent, and were easily boxed.—*W.R.O.G.*]

Phorocera, Rob. Desv.**32. ? *Phorocera*, sp.**

Sokotra : Adda Valley, E. of Hadibu Plain (28. I. 99).—Two specimens.

[These two specimens are particularly interesting, as they are evidently parasitic in the nests of the wasp (*Belenogaster saussurei*). Both specimens were hatched from a nest of this species — *W.R.O.G.*]

33. ? Genus (*Tachininae*).

Sokotra : Hadibu Plain (12. XII. 98).— One specimen.

34. ? Genus (*Tachininae*).

Sokotra : Dahamis (350 ft., 19. XII. 98) ; Adho Dimellus (3500 ft., 2. I. 99).

Rhinia, Rob. Desv.**35. *Rhinia testacea*, Rob. Desv.**

Rhinia testacea, Rob. Desv., Myodaires, p. 423 (1830) ; Macq. Suites à Buff., ii. p. 246 (1835) ; Schiner, Reise der Novara, p. 310 (1866) ; Corti, Ann. Mus. Civ. Gen., xxxv. p. 138 (1895).

Sokotra : 1 ♂, Dahamis (3500 ft., 19. XII. 98) ; 3 ♀, Homhil (1500 ft., 19.-21. I. 99) ; and Hadibu Plain (11. XII. 98).

Corti remarks that this species has a wide geographical range. Rob. Desvoidy gives Mauritius as the locality of the Type.

[This species was extremely fond of visiting our tents. It would buzz quietly along close to the ground investigating one's boots or anything that happened to be lying about the floor.—*W.R.O.G.*]

Idia, Meig.**36. *Idia simulatrix*, Loew.**

Idia simulatrix, Loew, Berlin K. Acad. Wiss., 1852, p. 660 ; Peter's Reise nach Mossambique, p. 25 (1862) ; Taschenb., Zeitsch. f. Naturw. Halle (4), ii. p. 182 (1883).

Sokotra : Wady Kischen.—(*Riebeck*).

Musca, Linn.**37. *Musca domestica*, Linn.**

Musca domestica, Linn., Fauna Suec., p. 453 (1761).

5 ♂, 2 ♀, Adho Dimellus (3500 ft., 14. II. 99) ; Homhil (1500 ft., 19. I. 99) ; and Hadibu Plain (11. XII. 98).

[The House-fly proved a great torment at times in the tents.—*W.R.O.G.*]

38. *Musca* (?) *spectanda*, Wied.

Musca (?) *spectanda*, Wied., Auss. Zweifl. Ins., ii. p. 419 (1830).

1 ♀, Hadibu Plain (11. XII. 98).

The Type came from Sierra Leone.

39. *Musca*, *sp.*

Sokotra : Below Adho Dimellus (3000 ft., 17. II. 99).—One specimen.

Calliphora*, Rob. Desv.*40. *Calliphora marginalis*, (Wied.)**

Musca marginalis, Wied., Auss. Zweifl. Ins., ii. p. 395 (1830).

Lucilia marginalis, Macq., Dipt. Exot. ii. p. 143 (1840) ; Karsch., Ent. Nach., xii. p. 257 (1886) ; id., Berlin Ent. Zeit., xxxi. p. 337 (1887).

Calliphora marginalis, Brauer, Denkschr. Akad. Wien., lviii. p. 420 (1891).

Sokotra : 4 ♀, Hadibu Plain (12. XII. 98) ; Gebel Raggit (600 ft., 15. XII. 98) ; Jena-agahan (1200 ft., 15. I. 99) ; and Dahamis (350 ft., 19. XII. 98).

The Type came from the Cape.

[This handsome species was only met with on the plains and lower slopes of the Haghier up to about an elevation of 1500 feet. It was always to be seen in numbers where there was any carrion or filth.—*W.R.O.G.*]

Lucilia*, Rob. Desv.*41. *Lucilia cyanea*, (Fabr.)**

Musca cyanea, Fabr., Spec. Ins., ii. p. 439 (1781) ; Id. Ent. Syst., iv. p. 319 (1794) ; Id. Syst. Anth., p. 292 (1805) ; Wied., Auss. Zweifl. Ins., ii. p. 397 (1830).

Lucilia cyanea, Macq., Dipt. exot., ii. p. 145, pl. xviii. fig. 4 (1840) ; Brauer, Denkschr. Akad. Weiss., lviii. p. 420 (1891).

Sokotra : 1 ♂, Dahamis (350 ft., 19. XII. 98) ; 4 ♀, Gebel Raggit (600 ft., 15. XII. 98) ; Dinehan Valley (3000 ft., 1. II. 99).

The Type came from the Cape.

[Takes the place of *C. marginalis* on the higher ground ; its habits are similar.—*W.R.O.G.*]

42. *Lucilia*, ? *sp. n.*

The palpi are yellow at the base and black at the tip.

Sokotra : 1 ♂, 1 ♀, Hadibu Plain (11.-13. XII. 98).

Cyrtoneura*, Macq.*43. *Cyrtoneura*, *sp.***

Sokotra : Adho Dimellus (3500 ft., 3. II. 99. and 18. II. 99) ; Dahamis (350 ft., 19. 12. 98).—Four specimens.

Stomoxys*, Geoffr.*44. *Stomoxys*, *sp.***

Sokotra : 1 ♂, 2 ♀, Hadibu Plain (11.-12. XII. 98) ; Dahamis (350 ft., 19. XII. 98).

Hæmatobia, *Rob. Desv.***45. Hæmatobia**, *sp.*

Sokotra : 2 ♂, Dimichiro Valley.

[These little flies swarmed all over the camels.—*W.R.O.G.*]

Hyetodesia, *Rond.***46. Hyetodesia**, *sp.*

Sokotra : 2 ♂, Adho Dimellus (3500 ft., 3. II. 99, and 14. II. 99).

Allied to *H. lucorum*, Fallen, a European species.

47. Hyetodesia, *sp.*

Sokotra : 1 ♂, Adho Dimellus (3500 ft., 5. II. 99).

Anthomyia, *Meig.***48. Anthomyia bifasciata**, *n. sp.* (Plate xxii. figs. 8, 8a.)

Type ♂, Dinehan Valley. Allied to *A. tonitru*, Wied., *Auss. Zweifl. Ins.*, ii. p. 429 (1830). Black, thorax with two grey bands, abdomen yellow with black central stripe and black bands.

Face with silvery-grey tomentum. Antennæ and palpi black. Forehead with a row of black bristles in the centre not quite reaching the vertex. Eyes sub-contiguous. Thorax with the first grey band on the anterior part, the second one on the posterior margin. Breast sides grey. Scutellum black, grey at its apex. Abdomen with the first and fourth segments black, and a black central stripe and black bands on the posterior margins of second and third; some faint white tomentum on the yellow part; pubescence black. Legs black, the knees lighter. Wings clear.

Length 5 mm.

Sokotra : 4 ♂, Adho Dimellus (3500 ft., 4. II. 99); Dinehan Valley (2500 ft. 1. II. 99).

[This handsome species was common, and might constantly be seen in companies "dancing" under the shade of the trees.—*W.R.O.G.*]

Lispe, *Latr.***49. Lispe**, ? *sp. n.*

Sokotra : Adho Dimellus (3500 ft., 12. II. 99).—Two specimens.

Atherigona, *Rond.***50. Atherigona**, *sp.*

Sokotra : 1 ♂, Adho Dimellus (3000 ft., 9. II. 99).

EPHYDRINÆ.

Ochthera, *Latreille.***51. Ochthera mantis**, *Deg.*

Ochthera mantis, Deg., *Ins.*, vi. 143 (1776); Schiner, *Fauna Austr.*, ii. p. 256 (1863).

Sokotra : 1 ♂, Adho Dimellus (3500 ft., 12. II. 99).

Identified by Col. Yerbury; a European species.

CHLOROPINÆ.

Oscinis, *Latreille*.52. **Oscinis**, *sp.*

Sokotra : Elhe, E. of Hadibu Plain (30. I. 99).—One specimen.

AGROMYZINÆ.

Agromyza, *Fall.*53. **Agromyza**, *sp.*

Sokotra : Adho Dimellus (3500 ft., 10. II. 99).—Three specimens.

OPOMYZINÆ.

54. ? **Genus**.

Sokotra : Hadibu Plain (14. XII. 98).—One specimen.

PHORIDÆ.

Phora, *Latr.*55. **Phora**, *sp.*

Sokotra : Adho Dimellus.—Fourteen specimens.

[Hatched out of grass and soil lifted with pupæ of Hawk Moth.—*W.R.O.G.*]

II.—The Flies of Abd=el=Kuri.

TABANIDÆ.

Tabanus, Linn.

1. *Tabanus*, *sp.*

Abd-el-Kuri, 1 ♀ (5. XII. 98).

[The only horse-fly I recollect seeing either here or in Sokotra during the three months spent on these islands.—*W.R.O.G.*]

ASILIDÆ.

Ommatius, Illiger.

2. *Ommatius tibialis*, *n. sp.* (Plate xxii. figs. 10, 10a.)

Type ♀. Black, tibiæ yellow, wings clear.

Face grey, moustache of white hairs, and long black bristles on the upper part, nearly reaching the antennæ, which are brown, the ocellar tubercle black, with black bristles. Thorax shining black, with grey tomentum, some white hairs and black bristles on the posterior part. Scutellum grey, with white pubescence. Abdomen with black pubescence, white at the sides. Legs black, tibiæ yellow, black at their extreme apex; the anterior and middle tarsi dull red, the underside of the femora with long white pubescence, which is also present on the upper side of the hind-femora; there are some long weak yellow bristles on the outer side of the fore and middle tibiæ, and elsewhere the pubescence and bristles are black. Wings with the small cross vein beyond the middle of the discal cell.

Length 9 mm.

Abd-el-Kuri, ♀ (22. II. 99).

BOMBYLIDÆ.

Argyromæba, Schiner.

3. *Argyromæba massauensis*, Jaennicke.

Argyromæba massauensis, Jaennicke, Abh. Senck. Gesell., vi. p. 336 (1868).

These agree with the description of the ♀ given by Jaennicke, but the one ♂ (?) which is so imperfect that it is impossible to ascertain the sex with certainty, has white, not black, hairs on the lower part of the face extending half-way up the sides of the eyes.

Abd-el-Kuri, 1 ♂, 1 ♂ (?) (22. II. 99).

Anthrax.

4. *Anthrax*, *sp.*

Abd-el-Kuri, 2 ♀ (9. XII. 98; 22. II. 99).

See page 368.

SYRPHIDÆ.**Syrphus, Fabr.****5. *Syrphus ægyptius*, Wied.**

Abd-el-Kuri, 1 ♀ (22. II. 99).

See page 369.

MUSCIDÆ.**Musca, Linn.****6. *Musca*, sp.**

Abd-el-Kuri (22. II. 99).

HIPPOBOSCIDÆ.**Olfersia, Meig.****7. *Olfersia* (?) *spinifera* (Leach).**

Feronia spinifera, Leach, Mem. Werner Nat. Hist. Soc., ii. p. 557, tab. xxvi. figs. 1, 3 (1818).

Olfersia spinifera, Wied., Auss. Zweifl. Ins., ii. p. 607 (1830); Schiner, Reise Novara, p. 373 (1866); Wulp, Tijds. v. Ent., xxiii. p. 193 (1880).

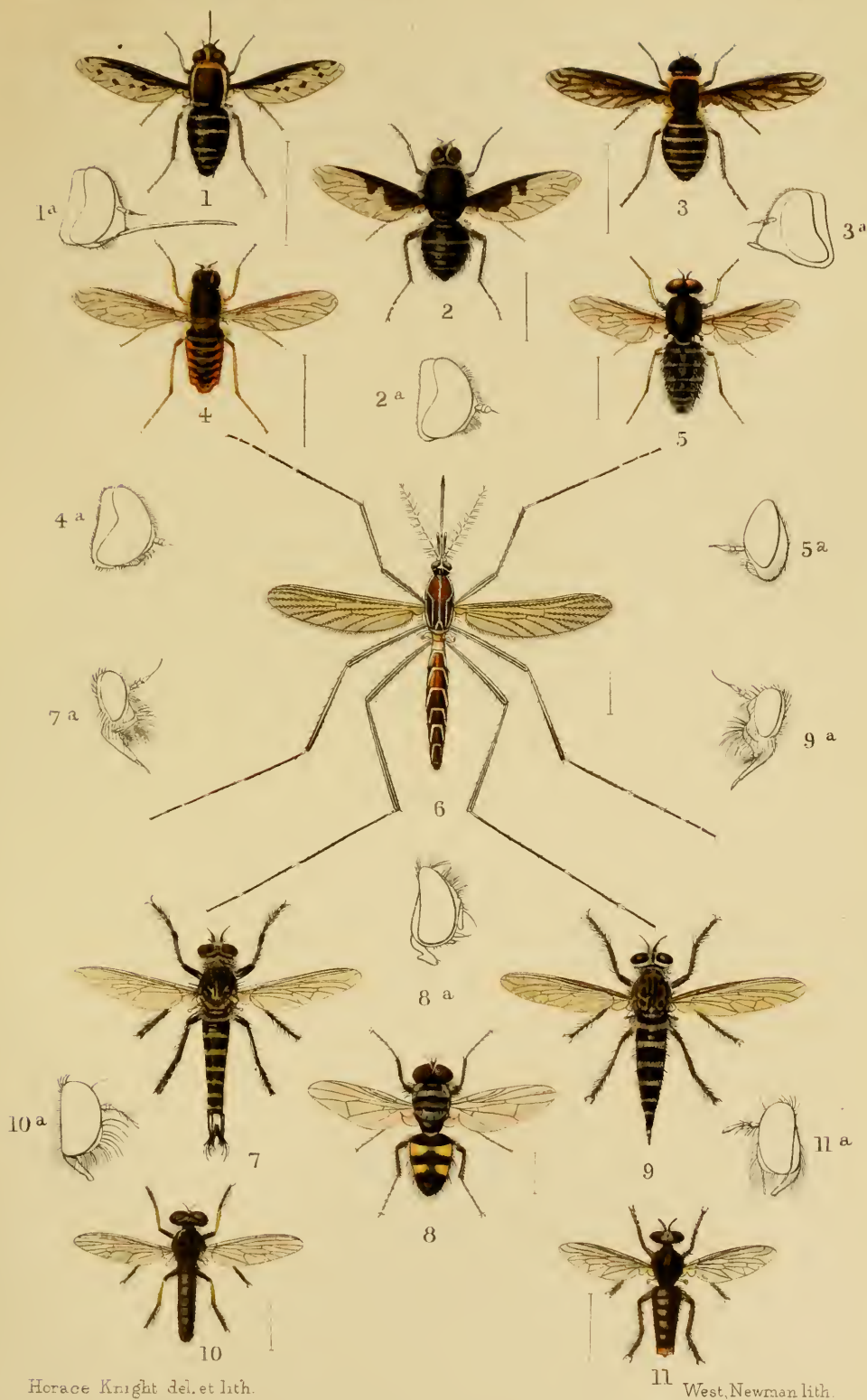
Abd-el-Kuri (23. II. 99).—Two specimens captured off a specimen of the Booby (*Sula sula*).

These may probably belong to this species, specimens of which Wiedemann believes to have come from the Cape. Schiner gives Batavia as the habitat of his specimens, and Van der Wulp, Java, for his. These agree fairly with Leach's plate, with the exception of the wing, which is clear, not shaded, as in the plate.

[Two Boobies (*Sula sula*) had no sooner been shot and lifted into the launch than two of these curious parasitic flies were seen to leave their bodies, run with great speed along the seat, and fly overboard. Their movements were so rapid that one had scarcely time to realise what they were, before they had disappeared. Two more were, however, captured as described above (see *Aves*, p. 62). It is extraordinary that these flies should be able to survive the constant immersions in salt water to which they are subjected.—H.R.O.G.]

PLATE XXII.

- Fig. 1. EXOPROSOPA PUNCTIPENNIS, *n. sp.*, ♂, p. 364.
Fig. 1a. *The same.*
- Fig. 2. ARGYROMÆBA FUSCIPENNIS, *n. sp.*, ♀, p. 366.
Fig. 2a. *The same.*
- Fig. 3. EXOPROSOPA INSULARIS, *n. sp.*, ♂, p. 365.
Fig. 3a. *The same.*
- Fig. 4. ANTHRAX SOKOTRÆ, *n. sp.*, p. 367.
Fig. 4a. *The same.*
- Fig. 5. PSILOCEPHALA ALBOHIRTA, *n. sp.*, p. 361.
Fig. 5a. *The same.*
- Fig. 6. STEGOMYIA GRANTI, *Theob.*, ♀, p. 360.
- Fig. 7. PROMACHUS SOKOTRÆ, *n. sp.*, ♂, p. 362.
Fig. 7a. *The same.*
- Fig. 8. ANTHOMYIA BIFASCIATA, *n. sp.*, ♂, p. 373.
Fig. 8a. *The same.*
- Fig. 9. PROMACHUS SOKOTRÆ, *n. sp.*, ♀, p. 362.
Fig. 9a. *The same.*
- Fig. 10. OMMATIUS TIBIALIS, *n. sp.*, ♀, p. 375.
Fig. 10a. *The same.*
- Fig. 11. HOPLISTOMERA NIGRESCENS, *n. sp.*, ♀, p. 362.
Fig. 11a. *The same.*



Horace Knight del. et lith.

West, Newman lith.

ARTHROPODA.

Insecta:
Hemiptera.

By G. W. KIRKALDY.

PLATE XXIII

Cicads and Bugs.

The Hemiptera collected by Mr. W. R. Ogilvie-Grant and Dr. H. O. Forbes in Sokotra and Abd-el-Kuri inspire one with a lively desire to acquire a more extensive knowledge of the Homopterous and Heteropterous fauna of these islands. Unfortunately the other branches of Zoology were so absorbing that little attention could be paid to this group, and no special search was made for them, only 43 specimens (35 imagines and 8 nymphs) being obtained, embracing 13 species, viz. :—2 Homoptera and 11 Heteroptera. Of special interest is the new species of *Klinophilos* [*Cinex* or *Acanthia* (*olim*)]. I would ask naturalists abroad to make a point of capturing and sending to me, in formalin or alcohol, the 'Bed-bugs' of the localities which they visit or in which they reside, as many new and interesting species are undoubtedly overlooked, or passed by as the 'Common Bug.'

I have to thank Mr. Ogilvie-Grant for providing numerous interesting biological details, which are distinguished by the addition of his initials.

I.—The Cicads and Bugs of Sokotra.

HOMOPTERA.

CICADIDÆ.

Cicadetta, *Kolenati*.

1. *Cicadetta omar* (*Kirk*). (Plate xxiii. figs. 1, 1a, 1b.)

Melampsalta omar, * *Kirk*, Bull. Liverp. Muss., ii. p. 45 (1899).

Covered thickly and almost entirely—less so on the abdomen—with short yellowish pubescence, and with long scattered hairs. Face closely striated transversely (†); rostrum reaching to intermediate coxæ. Anterior femora greatly incrassate, armed beneath with three stout sharp teeth; tibiæ slightly longer than femora, about $\frac{1}{3}$ longer than tarsi; third tarsal segment $3\frac{2}{3}$ longer than first, second $\frac{2}{3}$ longer than first. Intermediate and posterior femora, anterior and intermediate tibiæ, unarmed; posterior tibiæ with three long, acute spines

* The immortal Persian Poet.

† This character is not obvious owing to the pilosity.

on each side of the apical half. Intermediate tibiæ twice as long as tarsi, third tarsal segment about three times as long as first, which is slightly shorter than the second; posterior tibiæ nearly twice as long as tarsi, third tarsal segment about three times as long as first, second about one-half longer than the first. Tegmina immaculate, except that the apical margin of the exterior ulnar area is infusate. Wings immaculate.

Length of body $12\frac{1}{2}$ mm., expanse of tegmina 32 mm.

Sokotra: Adho Dimellus (3500 ft., 3. and 15. II. 99), and Homhil (2500 ft., 19. and 26. I. 99).

I think that too much reliance has been placed in the past upon colour and pattern for specific purposes; the 6 specimens before me seem all to be referable to one species, practically identical in structure, although varying in colour and pattern sufficiently to form at least three species according to some recent descriptions. I therefore now describe them in detail.

(α) 3 ♂.

Dull black, ocelli flavous or rufo-flavous; the apical three segments of antennæ flavescent; anterior margin of head (as seen from above) partly, posterior margin of pronotum very narrowly, posterior margin of the three middle abdominal segments more or less, sanguineo-flavous; lateral margins of clypeus narrowly sanguineous; posterior margin of mesonotum somewhat flavescent. Opercula sordid pale flavous or whitish apically, black laterally and basally. Venter sordid flavous, black centrally longitudinally. Anterior coxæ and femora longitudinally fasciate, tibiæ biannulate, intermediate femora narrowly apically, basal half of third posterior tarsal segment, and posterior spines wholly—sanguineous or sanguineo-flavous. Posterior tibiæ sanguineous; black narrowly at apex, broadly at base. Costa, &c., flavous; nervures flavous or sanguineo-flavous.

(β) 1 ♀.

Black; a large broad Y, the anterior and posterior margins and a number of spots on the head; the base of the Y continued along the pronotum, the base, lateral margins, &c., of the pronotum; lateral margins and two central lateral stripes on mesonotum; apical margins of abdominal segments more or less widely—flavous or luteous. Nervures same colour. Legs as in (α), except that the sanguineous is replaced by luteous. Clypeus spotted and broadly margined laterally with fuscous. Whole ventral surface pale luteous, except ovipositor and a central spot on each abdominal segment, &c.

(γ) 2 ♀.

A little smaller and much paler; luteous. Head and pronotum with three black blotches on head, two oblique inverted V's on pronotum. Venter immaculate; legs immaculate except very narrowly at base and apex of each segment; spines of anterior femora black.

[“The Cicadas were mostly captured at night, attracted by the light of the

lantern in one's tent. A few were found at rest under stones during the day."—*W.R.O.G.*]

I inadvertently used the name "*Melampsalta*" in the preliminary description. *Cicadetta*, *Tettigetta*, and *Melampsalta* were all founded simultaneously by Kolenati (1857, *Bull. Soc. Moscou*), but as they are now considered co-extensive, I have employed the first of the three. *Cicadetta* appears to be a most unsatisfactory genus from a specific point of view. In his *Monograph of Oriental Cicadidae*, Distant mentions scarcely a single structural character, while Karsch (1890 *Berl. Ent. Zeitschr.*, xxxv. 123-6) divides the African species primarily by coloration, one species—*C. musira* (Germ.)—being distinguished by its much narrower tegmina. According to the learned Doctor, in *musira* the tegmina are three times ($23 \div 8$), while in the other species the tegmina are only $2\frac{1}{3}$ - $2\frac{1}{2}$ times, as long as wide in the middle. One of the males herein described, however, has the tegmina fully three times, while the others have them only $2\frac{1}{2}$ times, as long as wide.

FULGORIDÆ.

Elasmoscelis, Spinola.

2. *Elasmoscelis iram*, Kirk. (Plate xxiii. fig. 2, 2a.)

Elasmoscelis iram, Kirk., Bull. Liverp. Muss., ii. p. 45 (1899).

Dark brown. ♂, frons long; marginal carinae distinctly diverging outwards towards the apical margin (that is to say *posteriorly*); central carina absent, except obsoletely towards the apical margin. Second antennal segment robust, subrotundate. Pronotum distinctly longitudinally carinate, with a tubercle on each side of the carina. Scutellum distinctly tricarinate longitudinally. Anterior femora and tibiae foliaceous, rather more elongate than in *E. cimicoides*. (Germ.). Blackish-brown; frons vermilion; lateral carinae altogether, and genae externally—green. Antennae testaceous. Elytra with a large white spot on the lateral margins of the corium, about the middle; a smaller whitish spot between the latter and the apical margin; apical margin whitish. Femora and anterior tibiae blackish-brown with whitish spots, intermediate and posterior tibiae and all the tarsi fusco-testaceous. Closely allied to *E. trimaculatus*, Walk.

Length (including tegmina) 6 mm.

Sokotra: Hadibu Plain (11. XII. 98).

[“Captured on a bath towel, on which the light of a lantern had been thrown to attract moths.”—*W.R.O.G.*]

HETEROPTERA.

ANTHOCORIDÆ.

Cimicida (in part) auctt.

Klinophilos, Kirkcaldy.

3. *Klinophilos horrifer*, Kirk. (Plate xxiii. fig. 3.)

Klinophilos horrifer, Kirk., Bull. Liverp. Muss., ii. p. 45 (1899).

Closely punctured on thorax and abdomen, covered with short hairs,

thicker and longer on the head and at lateral margins of pronotum and elytra, and at apex of abdomen. Rostrum not reaching anterior coxæ. Third segment of antennæ $\frac{1}{4}$ longer than second, which is three times as long as the first, and slightly longer than the fourth; first segment not quite attaining to apex of head. Pronotum convex, lateral margins not reflexed, antero-lateral angles prominently produced in front. Third tarsal segment twice as long as second, which is slightly longer than the first. Abdomen subrotundate posteriorly, first five ventral segments longitudinally bicarinate. Castaneous, unicolorous, except the blackish eyes and the flavous antennæ and pubescence.

Length of body 4 mm.

Habitat. Sokotra: Adho Dimellus (3500 ft., 16. II. 99.).—Very common; only one specimen in the collection.

Belongs to Stål's section "a a" (*Cimex* in *K. Sr. Akad. Handl.*, 1873, Band xi. No. 2, p. 104), and differs from *Acanthia rotundata*, Signoret (1852, *Ann. Soc. Ent. France* (2), x. p. 540, plate xvi. fig. 2), by the rounded apical parts of the abdomen, and the much more prominent antero-lateral pronotal angles.

The usual generic names for the 'Bed-bugs' are rejected (see *Entomologist*, 1899, p. 219); *Cimex bidens*, Linn., being the Type of *Cimex*, Linn., and *Cimex littoralis*, Linn., the Type of *Acanthia*, Fabr.

[“The example here recorded was found walking inside my mosquito curtain, and at first mistaken for a small beetle. A volume of “Vanity Fair” offering the most convenient means of capture, it was carefully squashed between the pages, when the odour at once proclaimed the objectionable nature of my visitor. Unfortunately, I did not attach any importance to this acquisition, and though other examples were seen and killed, none were preserved. So far as our experience went, this bug did not bite white men, and was, no doubt, a souvenir of the Arab camel-men who transported our baggage, or of the Sokotri natives who daily visited our camp.”—*W.R.O.G.*]

REDUVIIDÆ.

Reduvius, Fabricius.

4. *Reduvius azrael*, Kirk. (Plate xxiii. fig. 4.)

Reduvius azrael, Kirk., Bull. Liverp. Mus., ii. p. 46 (1899).

Antennæ very pilose. Second segment $\frac{5}{7}$ longer than first, not dilated near the apex, second $\frac{2}{3}$ longer than the third; rostrum scarcely reaching to middle of the central part of the prosternum. Longitudinal carinæ not nearly reaching the base of pronotum. Sides of corium and of abdomen glabrous. All the tarsi trisegmentate; posterior tibiæ very pilose. Venter sparsely pilose, basal four segments carinate.

Blackish; antennæ stramineous, apex of first and second segments black. Humeral angles of pronotum and extreme base ('apex' of most

authors!) yellowish, a few of the elytral nervures yellowish, membrane fuscous. Legs (except coxæ) flavo-stramineous, femora and tibiæ marked with black at base and apex. Connexivum whitish (or orange-yellow) spotted.

Length 15 mm.

Sokotra : Adho Dimellus (3500 ft., 3. II. 99 ; 9. II. 99).

Nymphs in (?) penultimate stage. (Plate xxiii. fig. 4a.)

Head much as in the imago, antennæ 4-segmentate only ; second, third, and fourth segments together longer than the whole body ; first as in adult, second not so thick as the first, but thicker than third or fourth ; second about $\frac{3}{4}$ longer than first, second and fourth equal, together equal to third. Rostrum not reaching anterior coxæ. Tarsi all bi-segmentate (the second represents the second and third in the imago). Sterna and first three abdominal segments elevated in the centre longitudinally. Abdomen rounded laterally ; nine dorsal, eight or nine ventral, segments visible.

Brownish, lighter on abdomen and legs, darker on head : coxæ, tibiæ, tarsi and apex of femora, sterna, basal ventral segments, and antennæ—pallid. Abdomen dorsally with two darker large spots near the centre of each segment and two on each connexival segment.

Length $9\frac{1}{2}$ mm., breadth near apex of abdomen $5\frac{1}{2}$ mm.

Sokotra : Hombil (1500 ft., 18. I. 99), and Jena-agahan (1200-2500 ft., 5. I. 99).—*W.R.O.G.*

[“The adult form was found among stones whilst we were searching for lizards. The curious larval forms were sometimes observed on the floors of the tents, their singular appearance and mode of progression at once attracting attention. When first captured the body was entirely concealed with grits of sand, empty bodies of ants, and other particles, but in travelling from place to place many of these became detached. When walking they move sideways, like a crab, and seem for all the world like animated “casting” of some small insect-feeding bird.”—*W.R.O.G.*]

Aspilocoryphus, Stål.

GEOCORIDÆ.

Lygaeidae, auctt.

5. *Aspilocoryphus forbesii*, Kirk. (Plate xxiii. fig. 6.)

Aspilocoryphus forbesii, Kirk., Bull. Liverp. Mus., ii. p. 46.

Pronotum, scutellum, and elytra densely punctured. Antennæ, fourth segment $\frac{1}{5}$ larger than the third and scarcely longer than the second, the latter twice as long as the first, which is stouter and furnished with short bristly hairs as in *Euthetus granti*.

Black ; second and third segments of antennæ at base, coxæ, tarsi more or less beneath—testaceous ; basal third of fourth antennal segment,

antero-lateral margins of pronotum, femora at base—whitish; a number of obscure minute testaceous spots on pronotum and a narrow ochreous longitudinal line (represented in one specimen by four spots, and absent in two specimens) on the apical half of basal lobe of pronotum; scutellum, with two small ochreous spots, the lateral margins and base (apex *aurth.*) testaceous. Exocorium and claval suture narrowly testaceous, the former with a blackish spot towards the apex. Tibiæ brownish, apically black. Allied to *A. fasciiventris* (Stål).

Length $10\frac{1}{2}$ - $12\frac{1}{2}$ mm.

Sokotra: Hadibu Plain (XII. 98); Jena-agahan (1200 ft., 29. I. 99);

Adho Dimellus (3500 ft., 3. II. 99).

Aspilocoryphus does not appear to me to afford sufficient generic characters for separation from *Lygaeosoma*, Spin. I have great pleasure in dedicating this species to Dr. H. O. Forbes.

[“Met with in dry, sandy spots, where they may be seen moving rather slowly about among the stones, occasionally making short flights of a few inches.”—*W.R.O.G.*]

Geocoris, Fallén.

6. *Geocoris sokotranus*, Kirk. (Plate xxiii. fig. 5.)

Geocoris sokotranus, Kirk., Bull. Liverp. Muss., ii. p. 46 (1899).

Head not punctured, furnished with short hairs, and a fovea on each side at the base; second and fourth segments of antennæ subequal, each $2\frac{1}{3}$ longer than the first, $\frac{1}{3}$ longer than the third. Pronotum densely punctured *all over*, except on the lateral parts of the central smooth transverse callosity; distinctly narrowed at the rounded antero-lateral margins. Scutellum closely punctured except on the central longitudinal carina. Clavus with one row of punctures along the corial margin; corium with two well-separated, slightly diverging rows of punctures along the claval margin, two rather more irregular rows on the pale exterior lateral margin. Membrane well developed. First tarsal segment (of each leg) equal to second and third together, third slightly longer than second.

Shining black; eyes subcastaneous, antennæ flavescent, second segment paler, first darker. Scutellum pale at extreme base (“apex” *aurth.*) and very narrowly pale laterally. Head beneath, anterior margin of prosternum, exocorium, and membrane, sordid flavescent.

Length, $4\frac{1}{4}$ mm.

Sokotra: Elhé, Hadibu Plain (30. I. 98).

This species does not seem to fit well into any of the divisions proposed by Fieber or Stål but perhaps best into Stål’s “h”—*Enum. Hemipt.*

[“Caught among the stones on the dry sandy ground near our camp at Elhé.”—*W.R.O.G.*]

LYGÆIDÆ.

Coreidae, anett.**Leptocoris**, *Hahn*.**7. *Leptocoris bahram***,* *Kirk*. (Plate xxiii. 8.)*Leptocoris bahram*, *Kirk*, *Bull. Liverp. Mus.*, ii. p. 46 (1899).

Head and pronotum furnished with sparse, short, somewhat stiff, black hairs, not readily perceptible on the disc of the pronotum, but thicker and closer on the lateral margins thereof. Jugal distinetly more elevated towards, and at, their apices than that of the tylus, and advanced a little in front of it; dorsum of head roundly raised, very narrowly sulcate from the base of the tylus to the space between the ocelli; a sub-oblique fovea on each side of the head alongside of and close to the eyes, its posterior extremity almost touching the nearer ocellus. Rostrum reaching to middle of first abdominal segment. Fourth segment of antennæ slightly longer than the third, which is slightly longer than the second, which is a little more than three times as long as the first; the latter extends beyond the apex of the head for about one-half its (the segment's) total length. Collar narrow, somewhat feebly punctured; anterior margin subtruncate, posterior margin bisinuate, slightly produced in the middle basally; posterior part of pronotum transversely subrugose, coarsely punctured, lateral margins slightly sinuate, the latter and the posterior margin narrowly reflexed; distinctly carinated longitudinally down the centre; an impunctuate callosity on each side of the carina, reaching laterally as far as the reflexed margin, posterior to the collar. Anterior and lateral margins of scutellum strongly elevated, extreme base acute. Metasternum sulcate. Clavus and corium punctured. First segment of posterior tarsi a little longer than the others together, third one-half longer than the second.

♂ First genital segment posteriorly subtruncate, posterior angles not produced.

Head collar, callosity, scutellum, &c., reddish-orange; rest of pronotum, elytra (except membrane), dorsum of abdomen, and whole ventral surface (except rostrum) yellowish-orange, deepening on the coxæ, ventral surface of head, elytral nervures, lateral margins of pronotum, &c., eyes dark crimson-red, ocelli a little paler; antennæ and legs (except coxæ) black; membrane and wings lurid (black in repose).

Length, 15 mm.

Sokotra: Hadibu Plain (XII. 98); Homhil (1200 ft., 17. I. 99); Adho Dimellus (3000 ft., 5., 6., and 9. II. 99).

The genus *Leptocoris*, *Hahn*., antedates *Serinettha*, *Spinola*, by six years; it must not be confounded with another Lygæid genus of very similar name, viz., *Leptocorise*, *Latr.* (= *Leptocorisa* anett.). The present species belongs to *Stål*'s section "a a" (*K. Sc. Akad. Handl.*, 1873, Band xi.

* "*Bahram*," a great Persian hunter.

No. 2, p. 100), and is distinguished from every other species known to me, except *fraternus*, Westw., (from which it is at once separated by the pale scutellum and elytra) by the apically elevated jugal.

[“The adult was generally met with among stones when searching for Lizards and Arachnida, &c. The orange-coloured nymph is very common on dry stony ground, and is extremely active, running with amazing rapidity.”—*W.R.O.G.*]

Nymphs in ultimate stage. (Plate xxiii. fig. 8a.)

Covered sparsely with short, stiff, black hairs, more sparingly on abdomen.

Head very similar to that of adult, except that the ocelli are absent (indicated by two white-ringed eye-like spots?). Rostrum 3-segmentate, first segment reaching base of head, second reaching base of mesosternum, third reaching middle of first abdominal segment. Pronotum transverse, collared in front, posterior margin notably sinuate. Scutellum sub-quadrate, base scarcely angular. Elytra and wings semicoriaceous. All the tarsi bi-segmentate. Ten abdominal segments visible dorsally, posterior margins of the first three straight, fourth scarcely sinuate, fifth medianly emarginate; the glandular openings of the fourth and fifth segments are very small, that of the fourth on the posterior margin, that of the fifth nearer the middle. Nine segments (1-7 and 9-10) visible ventrally (the eighth slightly visible ventro-laterally).

Pale luteous; head and eyes sanguineous. Antennae and legs reddish-piceous, coxæ and segmental articulations paler. Elytra and wings basally and laterally brownish-black. Glandular openings pale sanguineous.

Length $12\frac{1}{2}$ mm.

Sokotra: Homhil (1500-2500 ft.).

Euthetus, Dallas.

8. Euthetus granti, Kirk. (Plate xxiii. figs. 7, 7a.)

Euthetus granti, Kirk., Bull. Liverp. Mus., ii. p. 46 (1899).

♂ Strongly rugosely-punctured on pronotum, scutellum, and elytra. Furnished with short silvery hairs. First three segments of antennae sparsely furnished with short bristly hairs, much longer than the usual antennal clothing; first segment reaching apex of head, second slightly compressed towards the middle, slenderer than either the first or third; fourth $\frac{3}{5}$ longer than the third, which is three times as long as the second, first $\frac{3}{5}$ longer than the second. Posterior angles of pronotum acute, very slightly prominent. Posterior femora very slightly incrassate, slightly incurved, a little narrower towards the apex. Sixth abdominal segment apically truncate (seventh segment not visible from above), not laterally produced into spines; second-fourth segments ventrally carinate.

Black; clypeus and rostrum at the base greenish-yellow; first and second segments of antennæ at the base, anterior margin of prosternum (except in the middle), lateral margins of the frons, apical margins of pleura—testaceous; third and fourth antennal segments, tibiae and tarsi—fusco-testaceous, each of the tarsal segments black apically; femora sordid fuscous, uni-annulate with black and with white; abdomen scarlet dorsally, more or less the same colour ventrally. Corium (triangular patch near the junction of the clavus and membrane—excepted) and exocorium fusco-testaceous. *

♀ Similar to the male. Sixth abdominal segment somewhat deeply and widely roundly—emarginate; apical segment visible from above (fig. 7a).

Black; spots and lines on head and pronotum very narrow or almost obsolete. Abdomen scarlet dorsally, margins black—sixth-ninth segments black, except whitish median stripe; ventrally *black*, except a noticeable latero-apical whitish line on the third segment.

Length 10 mm.

Sokotra: Elhé, Hadibu Plain (30. I. 99).

I have great pleasure in dedicating this species to Mr. W. R. Ogilvie-Grant.

[Very common on the sandy plain near our camp at Elhé. Their movements are much like those of certain *Hymenoptera*, especially the ichneumons, as they run swiftly among the stones and roots with their antennæ constantly vibrating, and every few seconds make a short swift flight, which looks almost like a jump.—*W.R.O.G.*]

CIMICIDÆ.

Aspongopus, Laporte.

9. *Aspongopus assar*,† *Kirk*. (Plate xxiii. fig. 10.)

Aspongopus assar, Kirk, Bull. Liverp. Mus., ii. p. 4 (1899).

Scutellum and basal part of pronotum transversely rugose and irregularly closely punctured; clavus and corium somewhat superficially, dorsum of abdomen closely and finely, punctured. Second and fourth segments of antennæ depressed, slightly wider than fifth; fifth segment one-fourth longer than fourth, which is $\frac{3}{10}$ longer than third; second and third sub-equal, each $\frac{1}{3}$ longer than first. Lateral margins of pronotum narrowly reflexed, base of scutellum rounded. Head, antennæ, anterior part of pronotum (except laterally), legs, dorsum of abdomen, and entire ventral surface (except lateral margins of prosternum) black, with a slight reddish tinge in parts. Membrane sordid bronze, nervures with a violet tinge. Rest castaneous (in one

* One specimen, ♂, differs as follows:—Apical half, a narrow central longitudinal band and 2 lateral spots near base of head; anterior margin of pronotum narrowly, lateral margins widely—testaceous.

† “*Assar*,” a Persian poet; literally “an oil-presser.”

specimen, yellowish-brown), darker on disc of scutellum and on apical margin of corium.

Tarsal pilosity castaneous; ocelli rubid.

Length 15 mm.

Sokotra: Jena-agahan (1200 ft., 29. I. 99).

Apparently very closely related to *A. viduatus* (Fabr.), but the apical margin of the corium is sinuate, and the dorsum of the abdomen dull black (cyaneous in *viduatus*); moreover, the second segment of the antennae is somewhat longer than the third in *viduatus*, subequal to it in *assar*. Apparently also allied to *nigrovirens*, Pal., but at once separated by the colour of the dorsum of the abdomen (reddish in the latter).

Nymphs in penultimate (?) and antepenultimate (?) stages. (Plate xxiii. fig. 10a.)

Truncate-ovate. Antennae short and stout, quadri-segmentate, fourth about twice as long as third, which is a little shorter than the second, which is $2\frac{1}{3}$ times as long as the first. Rostrum reaches apex of intermediate coxae. Pronotum widely reflexed laterally. Meso- and metasternum sulcate. Tarsi bi-segmentate. Stigmata: thoracic (three on each side plainly visible) elongate; abdominal round (eight visible on the abdomen—not on the connexivum—near the apical margin of each segment). The three abdominal glands are very large (second and third larger than the first)—decreasing in comparative size as the nymph becomes older—transverse, about one-third of whole breadth of abdomen, situated dorsally in the centre of third, fourth, and fifth segments, which are deeply convexly emarginate. The thoracic orifices of the stink glands become visible in the penultimate stage. Nine or ten abdominal segments visible dorsally, each one (from the second to the ninth) transversely sulcate (there thus apparently being 18 abdominal segments). These segments are also, but more superficially, transversely sulcate ventrally.

Sokotra: Dahamis (350-1000 ft., 17. and 22. XII. 98).

Castaneous; head, antennae, legs, &c., black. Eyes sanguineous. Sterna sordid pale castaneous; abdomen ventrally greyish castaneous, stigmata black.

[“The imagines were picked up among some stones when searching for lizards and spiders. The nymphs were obtained in a cluster on a shrub near our camp at Jena-agahan, but I never observed them anywhere else.”—*W.R.O.G.*]

Geotomus, Mulsant & Rey.

10. Geotomus attar, * sp. nov. (Plate xxiii. figs. 9, 9a.)

Head very transverse, rugosely punctured, reflexed anteriorly with six or

* “Attar,” a famous Persian poet.

seven hairs on each side; central lobe fairly wide and subparallel, rather obsolete posteriorly, narrowed anteriorly. Ocelli nearer to the eyes than to the central line of the head. Rostrum reaching to the intermediate coxæ. Antennæ: second and third segments subequal; fourth and fifth subequal, each slightly longer than second or third. Pronotum subglabrous, punctured laterally and anteriorly; scutellum and corium more or less densely punctured, the former rounded at the base ('apex' *Signoret*); lateral margins of pronotum and corium piligerous. Membrane sub-hyaline.

♂ Sixth abdominal segment roundly excavated apically.

Reddish-pitchy, lighter on scutellum and corium, antennæ and tarsi still paler. Eyes rubid, ocelli clear luteo-stramineous.

Length $6\frac{1}{2}$ mm., breadth $4\frac{1}{2}$ mm.

Sokotra.

Appears to differ from the previously described species of the genus by the form of the ostiolar regions. (Plate xxiii. fig. 9a.)

Nezara, Amyot & Serville.

11. Nezara, sp.

I have not enumerated two species (embracing four specimens) of *Cimicide*, one of which is a *Nezara*, and, although apparently new, has not been described here as it appears to be immature in colouring.

II.—Bugs from Abd-el-Kuri.

Chroantha, Stål.

Chroantha ornatula, Schöff.

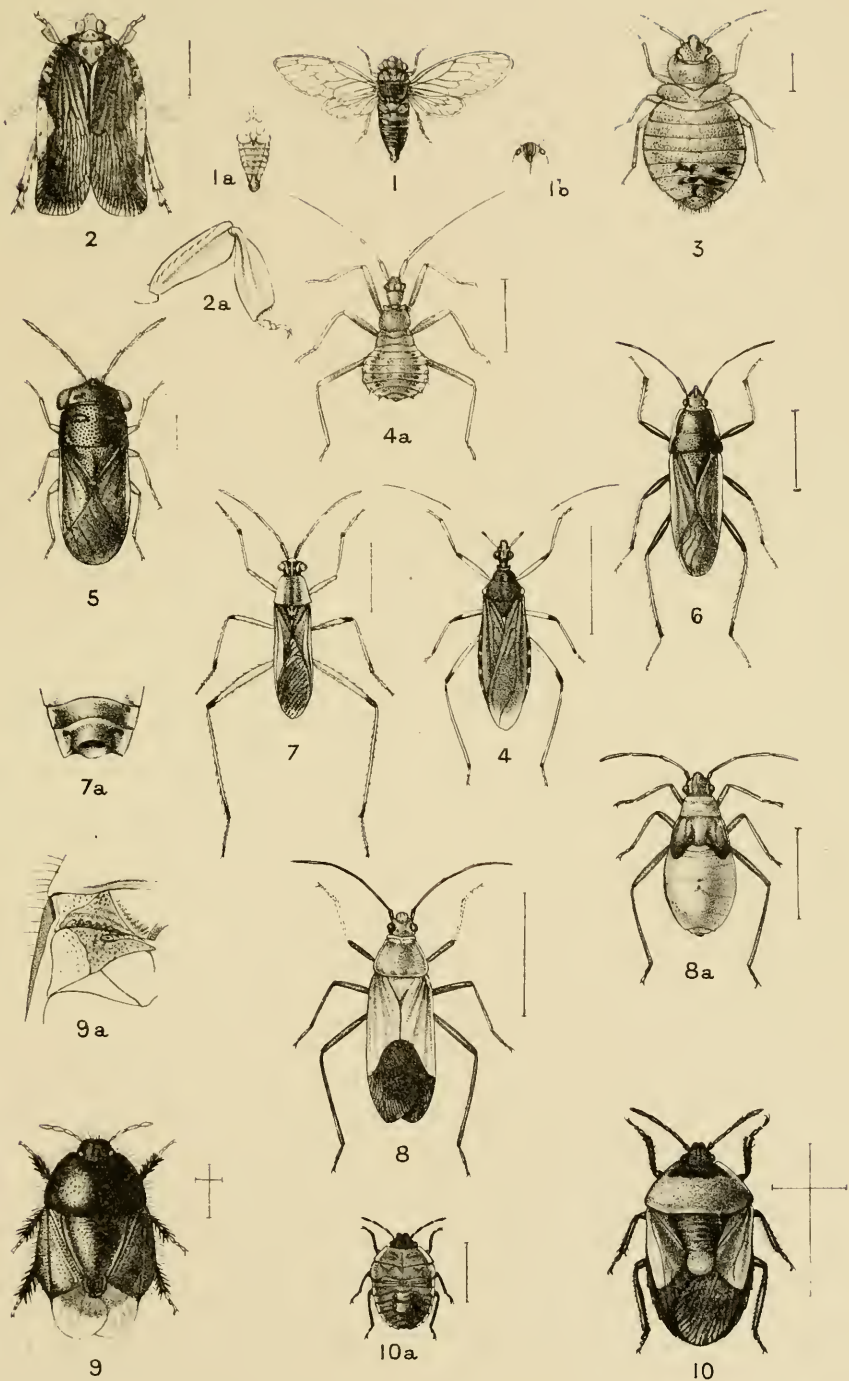
Chroantha (?) *hatauka*, Kirk., Bull. Liverp. Muss., ii. p. 47.

Abd-el-Kuri (5. XII. 98).

This specimen was described in the *Bulletin of the Liverpool Museums* (*loc. cit.*), as a doubtfully new species, but after a re-examination, it appears to me that, despite some minor differences, it is not sufficiently distinct to rank as a separate species from *C. ornatula*.

PLATE XXIII.

- Fig. 1. **CICADETTA OMAR**, *Kirk.*, ♂, p. 381.
Fig. 1a. *Abdomen of same (ventral).*
Fig. 1b. *Frons, &c., of same.*
- Fig. 2. **ELASMOSCELIS IRAM**, *Kirk.*, p. 383.
Fig. 2a. *Anterior leg of same.*
- Fig. 3. **KLINOPHILOS HORRIFER**, *Kirk.*, p. 383.
- Fig. 4. **REDUVIUS AZRAEL**, *Kirk.*, p. 384.
Fig. 4a. *Nymph of same.*
- Fig. 5. **GEOCORIS SOKOTRANUS**, *Kirk.*, p. 386.
- Fig. 6. **ASPILOCORYPHUS FORBESII**, *Kirk.*, p. 385.
- Fig. 7. **EUTHETUS GRANTI**, *Kirk.*, p. 388.
Fig. 7a. *Apical segments of ♀.*
- Fig. 8. **LEPTOCORIS BAHRAM**, *Kirk.*, p. 387.
Fig. 8a. *Nymph of same.*
- Fig. 9. **GEOTOMUS ATTAR**, *Kirk.*, p. 390.
Fig. 9a. *Sterna, &c., of same.*
- Fig. 10. **ASPONGOPUS ASSAR**, *Kirk.*, p. 389.
Fig. 10a. *Nymph of same.*



Horace Knight del et lith.

Mintern Bros imp.

HEMIPTERA FROM SOKOTRA.

ARTHROPODA.

Insecta:

Neuroptera.

Pseudo=neuroptera.

Note by HENRY O. FORBES, LL.D.

Amphibiotica.

By R. McLACHLAN, F.R.S.

Planipennia.

By W. F. KIRBY, F.L.S.

PLATES XXIV., XXIV A.

White Ants, Dragon=Flies, and Ant=Lions.

The White Ants of Sokotra.

PSEUDO-NEUROPTERA.

There are two species at least of Termites in Sokotra. The one erects a termitarium on the surface of the ground to a height of some 12 to 18 inches, of a red clay mixed with buccal or excrementitious matter which gives the clay so very tenacious a character that after being kneaded in the hands and dried it acquires a hardness almost equal to stone. These termitaria occur, as a rule, on bare, treeless spaces. It is a different species from that which, in Africa, makes the surprisingly large nests, 12 to 20 feet high, which have been described by travellers as looking from a distance like a cluster of native huts. None of the termitaria observed by us exceeded 18 inches in height.

The second species was found only among the scrub. Their colonies live in the hollows of dead branches, which they have eaten out and lined with woody, probably excrementitious, matter, and whose external shell they have also covered over with the same deposit. This deposit, instead of being of a tenacious character, is very friable, the nest generally falling to pieces on being touched.

Both species occurred up as high as our camp at Adho Dimellus ; but I have no record of them above that elevation.

In **Abd-el-Kuri** I observed no Termite nests.

The Dragon=Flies of Sokotra.

As very little was known of the Odonate fauna of Sokotra, the thirteen species found by Mr. Ogilvie-Grant form an item of importance, and it is very seldom I have had the pleasure of examining materials in this group preserved in better order.

The general aspect of the species is very distinctly African, or, to be more precise, I might say, Tropical African. An Indian element probably exists in the case of *Tramea burmeisteri* and *Macrodiplos vittata*. The palæarctic element may exist in the case of the unnamed *Orthetrum*, which belongs to a palæarctic "alliance," which, when tropical, is usually associated with considerable altitude.

I do not imagine these thirteen species represent the entire Odonate fauna of Sokotra. Having regard to the position of the island, and the known migratory powers of these insects, it is possible that the number of species that occur will remain very much an unknown quantity. The really endemic species could only be ascertained by residential observations extending over a series of years. But the practically certain immigrant (or "sporadic") element derived mostly from the west, but also partially from the east, is the unknown quantity.

AMPHIBIOTICA.

ODONATA.

LIBELLULINÆ.

Pantala, *Hagen*.

1. *Pantala flavescens* (*Fab.*).

Libellula flavescens, Fabr., Ent. Syst. Suppl., p. 285 (1798).

Sokotra : Hadibu Plain (12. XII. 98).—1 ♀.

[Sides of abdomen ochre, pale greenish-grey on each side, the black marking down the middle.—*W.R.O.G.*]

Tramea, *Hagen*.

2. *Tramea burmeisteri*, *Kirby*. (Plate xxiv. fig. 4).

Tramea burmeisteri, Kirby, Trans. Zool. Soc., xii. p. 316 (1889).

Sokotra : Hadibu Plain (13. XII. 98).—2 ♂.

[Thorax (in life) yellowish-brown, abdomen dark crimson (or earmine) marked with black.—*W.R.O.G.*]

This is scarcely more than the Indian race of *T. basilaris*, Beauv., which is mostly West African in distribution. The Sokotran examples agree

better with the Indian in the slight points of difference, the most marked of which is that the irregular brown crescentic marking at the base of the hind-wings invades the triangle in *basilaris*, and does not ordinarily do so in *burmeisteri*.

It is to be remarked that Mr. Kirby's name, *burmeisteri*, was professedly bestowed upon *T. chinensis*, Burm., which Mr. Kirby did not consider to represent De Geer's species of that name, and there is something in Burmeister's description that would seem to warrant such an idea. But Dr. Calvert, in his review of Burmeister's types (*Trans. Amer. Ent. Soc.*, xxv.), passes "*chinensis*" without comment.

Rhyothemis, Hagen.

3. *Rhyothemis semihyalina*, Desjardins, race *separata*, Selys (♀). (Plate xxiv A. fig. 3.)

Libellula separata, Selys, Lucas Expl. Alg., iii. p. 115, pl. 1. fig. 1 (1849).

Sokotra: Hadibu Plain (12.-16. XII. 98).—4 ♂.

[Colour in life—Thorax and abdomen bluish-black.—*W.R.O.G.*]

These examples are of somewhat large size (abdomen 20-21 mm., posterior wing 29-31 mm.), the hyaline portion of the wings tinged with olivaceous, the opaque basal portion of the posterior not reaching the nodus, the pterostigma rather long (2.5 mm.), the nodus in the anterior placed midway from the base to the end of the pterostigma.

The Type form of *semihyalina* (or *hemihyalina*, as it is often termed) was from the island of Mauritius, and is smaller, with a shorter pterostigma, the opaque portion of the posterior wings often extending to the nodus, &c. The form described by De Selys from Algeria as *separata* would also seem to have been smaller, and to have had the outer edge of the opaque portion of the posterior wings more regular according to the figure in Lucas' *Exploration d'Algérie*. I have never seen the Algerian insect.

A form very similar to that from Sokotra, but from Central Africa, has been described by Mr. Kirby as *Rh. ducalis*.

Macrodiplax, Brauer.

4. *Macrodiplax vittata*, Kirby. (Plate xxiv A. figs. 4, 4a.)

Urothemis vittata, Kirby, Journ. Linn. Soc., Zool., xxiv., p. 552, pl. xlii. fig. 2 (1894).

Sokotra: Hadibu Plain (12. XII. 98).—1 ♀.

On comparing this with Kirby's Types (*Urothemis vittata*, Kirby) from India and Ceylon, the only point of difference appears to be that in the Sokotran insect the face is purer white. I do not feel inclined to bestow a name on this single example.

In fact, it may be that *M. lycoris*, Selys (united by De Selys to *nigrilabris*, Selys), and *M. vittata* are only races one of the other. *M. vittata* is smaller, the labrum less distinctly black, the median lobe of the labium scarcely blackish, and the side lobes not margined with

blackish (some minute points of neural detail can scarcely be settled from scanty material). The vulvar scale is distinctly but shallowly bilobed in both *lycoris* (*nigrilabris*) and *cittata*. De Selys (*Ann. Soc. Ent. Belg.*, xli. p. 74) speaks of the vulvar scale in *lycoris* as "subarrondie," but in his original description of *lycoris* (*Rev. et Mag. Zool.*, Mai, 1872) he alludes to it as "paraissant échancrée."

Another point is here involved. *Lib. lycoris*, De Selys, was originally described by him as from Mauritius or Madagascar. But in 1897 (*Ann. Soc. Ent. Belg.*) he was induced to consider this doubtful locality distinctly erroneous, and he united the oriental *nigrilabris* with the hitherto supposed African *lycoris* as one and the same species. Now that an African (albeit insular) example of the genus has been discovered, it is perhaps desirable that the whole subject be reconsidered.

Trithemis, Brauer.

5. **Trithemis arteriosa**, *Burm.*, race **distincta** (*Ramb.*). (Plate xxiv. figs. 1 ♂, 2 ♀.)

Libellula distincta, *Ramb.*, *Ins. Névr.*, p. 85 (1842).

Sokotra: Hadibu Plain (11.-13. XII. 98), 6 ♂, 7 ♀; and Goahal Gorge (200 ft., 27. I. 99), 1 ♂.

In varying degrees of maturity. The colours of the living males are variously given by Mr. Grant as "bronze-carmine, and black," "crimson-carmine, and black," "dull bronze-madder, and black," and of the female it is said "greenish-ochre with black marks."

These examples are referred to the race *distincta* mainly on the description and especially the figure given by De Selys in Lucas' *Exploration d'Algérie*. It is there given as *conjuncta*, *Ramb.*, but it was subsequently discovered (*cf. Ann. Soc. Ent. Belg.*, xiv. p. 12) that the true *conjuncta* is American. The principal reason for so doing is the large extension of yellow coloration at the base of the wings, much simulating *Sympetrum flaveolum*. The female has the body strongly marked with black. According to Dr. Calvert, the Type of *arteriosa*, *Burm.*, has the yellow at the base of the wings very much less extended, as in a form widespread over Africa.

It must be remembered that *Rambur's distincta* was from the Cape, and De Selys' from Algeria. A thorough revision of the African species or races of *Trithemis* is necessary, based on very exact local data. It is a genus in which the genitalia of the second segment, usually of such great importance, seem to afford little help, being much the same in obviously distinct species, such as *arteriosa* and *rubrinervis*.

Crocothemis, Brauer.

6. **Crocothemis erythræa**, *Brullé*.

Libellula erythræa, *Brullé*, *Expéd. de Morée*, iii. (1) p. 102, pl. xxxii. fig. 4 (1832).

Sokotra: Hadibu Plain (16. XII. 98).

6 ♂ of this widespread species.

[Colour in life—Entirely carmine. Two specimens have the general colour ochre.—*W.R.O.G.*]

Diplacodes, Kirby.

7. *Diplacodes flavistyla*, Ramb.

Libellula flavistyla, Ramb., Ins. Névr., p. 117 (1842).

Sokotra : Hadibu Plain (11.-15. XII. 98).—5 ♂, 3 ♀, all mature.

[Of the living ♂ the body colour is blue-black, and of the ♀ blue-blackish-grey.—*W.R.O.G.*]

Orthetrum, Newman.

8. *Orthetrum*, n. sp. (?)

Closely allied to *O. chrysostigma*, Burm.

Sokotra : Homhil (1500 ft., 24. I. 99)., 1 ♂, 1 ♀ ; Adho Dimellus (3500 ft., 15. II. 99), 1 ♂, 1 ♀.

It may be that this is really *O. chrysostigma*, or a local race thereof, and I am not disposed to risk the creation of additional synonymy by bestowing a name, and I now doubt very much the supposed identity of *chrysostigma*, Burm., with *barbara*, Selys, from Spain, Algeria, &c.

ÆSCHNINÆ.

Anax, Leach.

9. *Anax mauricianus*, Ramb.

Anax mauricianus, Ramb., Ins. Névr., p. 184 (1842).

Sokotra : Addah Valley (30. XII. 99), 1 ♂.

[Colour in life—Dull grey blue.—*W.R.O.G.*]

What I now understand by *mauricianus* consists of all those examples very closely allied to *imperator* (*formosus*), found in tropical and Southern Africa, Madagascar, and the smaller South African islands. In Northern Africa it is *imperator* that occurs, and I now feel sure that the example, presumably from Madeira, to which I formerly (*Neuroptera of Madeira and Canaries*) applied the name *mauricianus*, was only *imperator*.

These tropical and southern African specimens are always more slender than the more northern *imperator*, and there appears to be a decided difference in the superior appendages of the ♂, which in *mauricianus* are more deeply excised on the inner edge before the apex. Rambur calls attention to these characters, and adds others as regards colour, which are problematical, and with regard to the length of the pterostigma, which is variable. I have never yet seen an example of *mauricianus* in which the abdomen was not discoloured, and it is very desirable to prepare some when fresh, so that the markings can be compared.

Hemianax, *Selys*.

10. *Hemianax ephippiger*, *Burm.* (Plate xxiv. fig. 3.)

Æschua ephippigera, *Burm.*, *Handb. Ent.*, ii. p. 840 (1839).

Sokotra : Hadibu Plain (16. XII. 98), 2 ♂.

[Colour in life—Greenish-yellow, first segment of abdomen cobalt-blue, markings black.—*W.R.O.G.*]

AGRIONINÆ.

Ischnura, *Charpentier*.

11. *Ischnura* (?) *granti*, *sp. n.* (Plate xxiv A. figs. 1, 1a, 1b ♂, 2, 2a ♀.)

♂ Head black above ; frons transversely bluish ; rhinarium black ; labrum and under parts yellowish-white ; post-ocular spots very elongate-pyriform, blue, connected by a fine blue line.

Prothorax black, its posterior edge raised and nearly semicircular, very slightly produced and bluish in the middle : on the middle of the disc are two closely placed minute bluish elongate points.

Thorax deep black, the dorsal crest and an ante-humeral line pale bluish, the sides pale bluish enclosing two narrow black lines, one on the first lateral suture, the other metepimeral, abbreviated and slightly converging anteriorly. Pectus whitish.

Legs whitish with black spines ; the outer side of the femora, and of the tibiae at base, black ; tarsal joints black at the tips ; tibial spines moderately long, five-six on the intermediate and posterior.

Abdomen long and slender, bronzy-black above with a bluish ring anteriorly on segments three to seven, segments nine and ten wholly deep blue ; the sides of segments one to five bluish-white, with an extension of the dorsal black immediately before the base of three to five.

The margin of the tenth dorsal segment slightly elevated, truncated, excised in a broadly triangular manner if viewed from above ; viewed in front, there is an open tube immediately below the margin, below which are the whitish, not prominent, superior appendages in the form of two swollen lobes, but each with a lower and more elongate black obtuse branch (which may possibly pertain to the inferior appendages) ; inferior appendages black, distinct at the base, the upper edge excised and the apex slightly incurved, not prominent.

Wings hyaline, neuration black ; pterostigma rhomboidal, blackish with narrowly paler margins, covering rather more than one cellule in the anterior, rather less in the posterior ; post-costa commencing slightly before the first post-coatal nervule ; upper edge of quadrilateral about one-third as long as the outer in the anterior, and one-half the length in the posterior ; thirteen to fourteen post-nodals in the anterior, twelve in the posterior.

♀ Head and thorax as in the ♂, but the pale bluish colour of the markings is replaced by dingy yellowish, the sides of the prothorax broadly of that colour.

Legs as in the ♂, but the black is reduced.

Abdomen coloured much as in the ♂, but above it is apparently only the tenth segment that is blue; the sides and beneath whitish for nearly the whole length, with black segmental divisions and an extension of the black dorsal colour near each end of most of the segments. A strong, sharp, triangular, apical tooth on the eighth ventral segment. Appendages short, broad, stout, and conical, very obtuse black. Valvules white with black filiform appendages.

Wings apparently not essentially differing from those of the ♂.

Length of abdomen, ♂, ♀, 33-34 mm.; posterior wings, ♂, ♀, 23-24 mm.

[Colour of ♀ in life—Above deep bottle-green; lower half of eyes and band across head pale blue; longitudinal bands on thorax pale straw, lower half of abdomen pale greenish-grey; nine pale blue bands (the segmental divisions) down back.—*W.R.O.G.*]

Sokotra: Dahamis (19. XII. 98), 1 ♂; Jena-agahan (1200 ft., 11.-12. I. 99), 2 ♀.

This insect is difficult to locate generically, and one wavers between *Enallagma* and *Ischnura*. I have decided on the latter principally on account of the colours and the slight elevation of the tenth dorsal segment in the ♂, but the prothorax and size would be more in favour of *Enallagma*.

12. *Ischnura* (?), *n. sp.* ?

A small species, not a true *Ischnura*, but deceptively resembling one.

Sokotra: Hadibu Plain (12.-16. XII. 98), 2 ♂.

[Colour in life—Cobalt-blue with black markings.—*W.R.O.G.*]

Ceriagrion, *Selys*.

13. *Ceriagrion glabrum*, *Burm.*

Agrion glabrum, Burm., Handb. Ent., ii. p. 821 (1839).

Sokotra: Hadibu Plain (16. XII. 98), 1 ♂.

[Colour in life—Eyes green, abdomen reddish-orange.—*W.R.O.G.*]

[In **Abd-el-Kuri**.—No Dragon-Flies were observed.]

The Ant-Lions of Sokotra.

PLANIPENNIA.

MYRMELEONIDÆ.

Acanthaclisis, Rambur.

1. *Acanthaclisis lineata*, *sp. n.*

Long. corp. 23-30 mm. ; long. al. ant., 32 mm. ; long. al. post., 30 mm.

Antennæ rather long, gradually thickening towards the obtusely rounded extremity, reddish, browner towards the extremity, and annulated with white. The greater part of the insect clothed with long pale grey hair. Face white, vertex blackish, but bordered behind with grey. A rather narrow black stripe, bisected by a white line, extends from the back of the vertex over the prothorax, mesothorax, and scutellum, but most distinctly on the prothorax. Prothorax with two rather widely separated lateral lines, the inner one turning obliquely outwards and hindwards, parallel with an oblique line running backwards from the middle of the double central stripe. Mesothorax with two parallel lateral lines ; scutellum with one lateral line only. Abdomen carinated in the middle, and margined on the sides, blackish, slightly tinged with reddish, clothed above with short hair, and with some slight reddish markings towards the extremity of the last two segments on the median line ; a red mark is also visible beneath the white hair on each side of the extremity of the postscutellum. Under-surface blackish, densely hairy ; legs reddish, the tips of the tibiæ and the tarsi blackish. Apical half of spurs slender, bent at a right angle. Cerci of male reddish, about twice as long as broad, obtusely rounded at the extremity, and set with stiff diverging hairs as long as the cerci. Wings hyaline, the neuration brown, alternating with tawny and white. Nervures of the costal area only bifurcating a little before the extremity of the cell in the fore-wings, and not till beyond it in the hind-wings ; nervures of the apical area with numerous bifurcations ; marginal nervures regularly bifurcated.

Sokotra : Hadibu Plain (15. XII. 98).—Five specimens.

This species belongs to the group of *A. distincta*, Rambur, which differs from typical *Acanthaclisis* in not possessing a double row of costal cells from the base, and should form a separate genus ; but it is not worth while making new genera of *Myrmeleonidae* without thoroughly revising the family. The insect is closely allied to, if not identical with, an insect described by Walker, from Natal, as *Myrmeleon distinctus*, var. (?) [*List. Neur. Ins. B.M.*, ii. p. 360 n. 30 (1853)]. It is

also allied to *M. molestus*, Walk., but this is a redder insect, with smaller and darker black markings on the wings.

Creagris, *Hagen*.

2. Creagris mortifer, *Walk.*

Myrmecleon V-nigrum, Walker (nec Ramb.), List Neu. Ins. B. M., ii. p. 351 n. 84 (1853).

Myrmecleon mortifer, Walk., l.c. p. 353 n. 88 (1853).

Myrmecleon perrigil, Walk., l.c. p. 354 n. 89 (1853).

Sokotra : Dahamis (1000 ft., 22. XII. 98).—A single specimen, which appears to be closely allied to, if not identical with, this well-known species from Natal.

[In Abd-el-Kuri.—No Ant-lions were collected or observed.]

PLATE XXIV.

- Fig. 1. TRITHERNIS ARTERIOSA, *Burm.*, race DISTINCTA,
Ramb., ♂, p. 400.
- Fig. 2. *The same*, ♀.
- Fig. 3. HEMIANAX EPHIPPIGER, *Burm.*, p. 402.
- Fig. 4. TRAMEA BURMEISTERI, *Kirby*, p. 398.

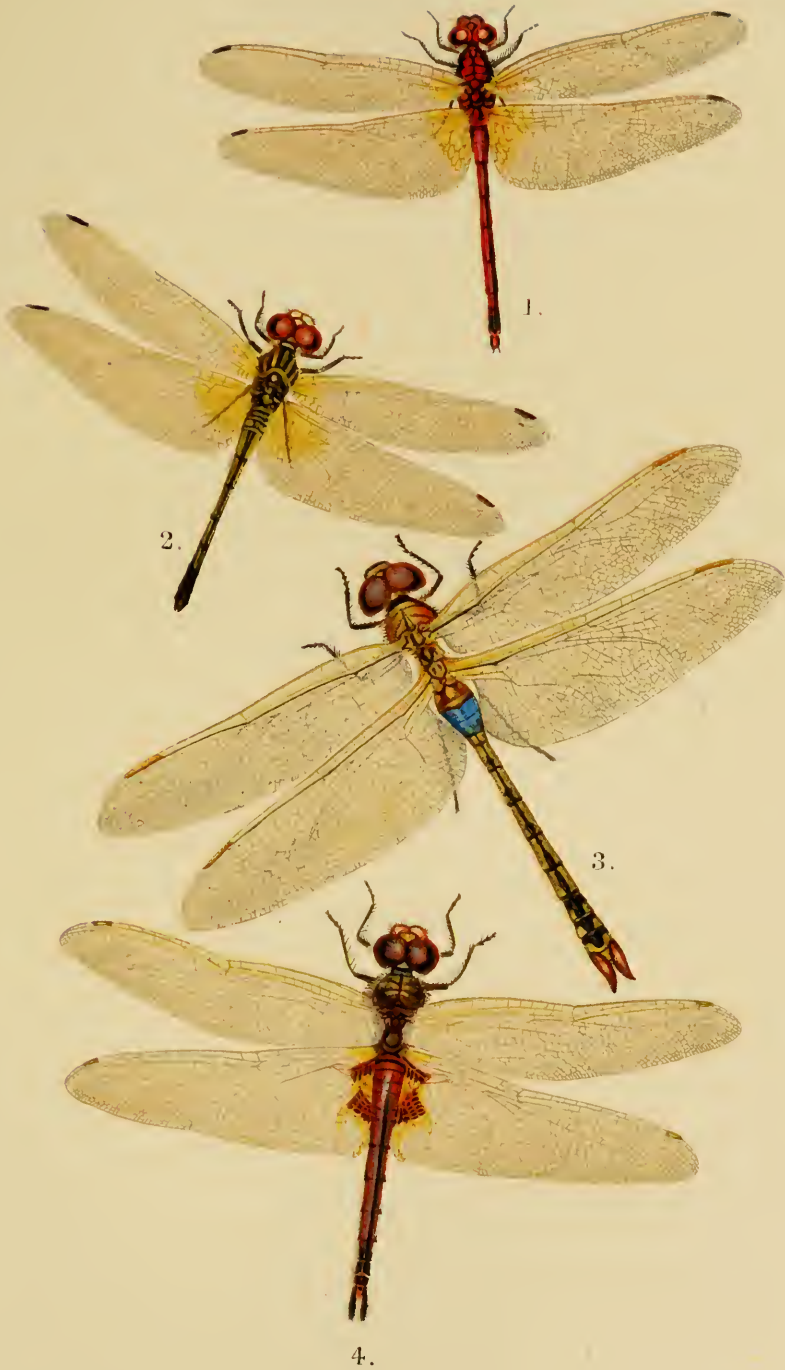


PLATE XXIV A.

Figs. 1, 1a, 1b. ISCHNURA (?) GRANTI, *sp. n.*, ♂, p. 402.

Figs. 2, 2a..... *The same*, ♀.

Fig. 3. RHYOTHEMIS SEMIHYALINA, *Desj.*, race
SEPARATA, *Selys (l)*, p. 399.

Figs. 4, 4a..... MACRODIPLAX VITTATA, *Kirby*, p. 399.



Horace Knight del et lith.

West Newman chromo.

DRAGONFLIES FROM SOKOTRA.

ARTHROPODA.

Insecta:
Orthoptera.

By MALCOLM BURR, F.L.S., F.Z.S., F.E.S.

PLATE XXV.

Earwigs, Crickets, and Grasshoppers.

For our knowledge of the Orthoptera Fauna of Sokotra we are indebted to three sources.

First, the species mentioned by Taschenberg, sixteen years ago, when he described the peculiar *Mecopoda abbreviata*, a most interesting form.

Second, six species brought from the island by Mr. E. N. Bennett, in 1896, determined by me, among which was a new *Poeciloceris*.

Third, the materials collected by Mr. Ogilvie-Grant and Dr. H. O. Forbes, which are worked out in the following pages.

I know of no other records of Orthoptera from the island of Sokotra ; and none from Abd-el-Kuri besides those made by the present Expedition.

Out of the thirty-three species collected, six are new to science, and there are two new genera. The numbers of species of each family are as follows :—

	In the collection.		Species known from Sokotra not included in the collection.		Total.
	Known species.	New species.			
Forficularia	5	0	1	6	
Blattodea	2	1	0	3	
Mantodea	0	1	0	1	
Phasmatodea	0	0	0	0	
Aceridiodea	10	4	2	16	
Locustodea	2	0	0	2	
Gryllodea	3	0	2	5	
Total	22	6	5	33	

LIST OF SPECIES.

Forficularia.

1. *Labidura riparia* (Pall.) Cosmopolitan.
2. *Forficula smyrnensis*, Serv. Palearctic.
3. *Forficula lucasi*, Dohrn. Cosmopolitan.
4. *Anechura fedtchenkoi* (Sauss.) Palearctic.
5. *Anisolabis stali* (Dohrn) Oriental (? Cosmopolitan).
6. *A. martina*, Bon. Cosmopolitan.

Blattodea.

7. *Phyllodromia unicolor*, Brunner . . . Oriental.
 8. *Loboptera peculiaris*, Burr . . . Endemic.
 9. *Periplaneta americana* (Linn.) . . . Cosmopolitan.

Mantodea.

10. *Teddia dioscoris*, Burr . . . Endemic (Palearctic).

Acridiodea.

11. *Truxalis nasuta* (Linn.) . . . Palaegean.
 12. *T. ensis*, Burr . . . Endemic (mainly Ethiop.).
 13. *Epaeromia thalassina* (Fabr.) . . . Palearctic.
 14. *Plagiotriptus insularis*, Burr . . . Endemic (Ethiop.).
 15. *Phaulotypus granti*, Burr . . . Endemic (Orient.).
 16. *Edaleus senegalensis* (Kr.) . . . Cosmopolitan.
 17. *Dissosteira forbesii*, Burr . . . Endemic (Nearctic).
 18. *Aerotylus longipes* (Charp.) . . . Ethiop. Palearc. Cosmp.
 19. *Sphingonotus caeruleus* (Linn.) . . .
 (*Abd-el-Kuri*) . . . Palearctic.
 20. *S. savignyi* Sauss. (*Abd-el-Kuri*) . . . Ethiopian.
 21. *Pyrgomorpha cognata* (Krauss).
 (*Abd-el-Kuri*) . . . Ethiopian.
 22. *Pæcillocerus sokotranus*, Burr . . . Endemic (Ethiop.).
 23. *Oxya vicina*, Brunner . . . Oriental.
 24. *Cataloipus oberthuri*, Bol. . . Ethiopian.
 25. *Caloptenus italicus* (Linn.) . . . Palearctic.
 26. *Aceridium tataricum* (Linn.) . . . Ethiopian.
 27. *Aceridium*, sp. . . .

Locustodea.

28. *Phaneroptera nana*, Charp. . . Ethiop. (Palearctic).
 29. *Phaneroptera*, sp. . . .
 30. *Pachysmopoda abbreviata* (Tasch.) . . . Endemic.

Gryllodea.

31. *Liogryllus bimaculatus* (de Geer) . . . Cosmopolitan.
 32. *Gryllus lepidus*, Walk. (?) . . . Orient. (Ethiop.).
 33. *Cophogryllus*, sp. . . . Ethiop.
 34. *Landreva*, sp. . . . Ethiop.
 35. *Ceanthus pellucens* (Scop.) . . . Palearctic.

	Forf.	Blatt.	Mant.	Aerid.	Loc.	Gryll.	Total.
Endemic.....	0	1	1	5	1	0	8
Oriental	1	1	0	1	0	1	4
Ethiopian	0	0	0	5	1	2	8
Palearctic	2	0	0	5	0	1	8
Cosmopolitan	3	1	0	2	0	1	7
Total	6	3	1	18	2	5	35

In the above I have not included the three uncertain species of Gryllodea, and I have regarded as cosmopolitan such forms as are common to two regions, as *Acerotylus longipes* (Charp), which occurs in the Palearctic and Ethiopian regions. The affinities of the endemic species are given in parentheses.

From the Orthoptera alone it will be seen, that the Fauna of Sokotra has very strong Ethiopian affinities, but almost equally close relations with the Palearctic region. Of the novelties, *Loboptera peculiaris* n. belongs to a genus with wide distribution; one species is essentially South European, while others are Australian and Indian. *Teddia* n. g. falls into a group of genera occurring in North Africa and Western Asia, while *Truxalis ensis* n. represents a genus which is found throughout the Old World. *Plagiotriptus* (sp. n. *insularis*) is an African genus, with Oriental affinities, and *Phaulotypus* g. n., as far as we know yet, is restricted to Sokotra, but its nearest allies are Oriental. *Dissosteira forbesii* sp. n. is interesting, for, with one exception, the genus is characteristically American; the exception, *D. saucia*, occurs in South Africa.

A noteworthy point is that, as yet, not a single species of *Phasmatodea* is known from Sokotra, and only one of *Mantodea*, and that is peculiar to the island; *Locustodea* also appear rare, for I only know of two species hitherto recorded from Sokotra.

I.—Earwigs, Grasshoppers, and Crickets of Sokotra.

FORFICULARIA.

FORFICULIDÆ.

Labidura, Leach.

1. *Labidura riparia* (Pall.).

Forficula riparia, Pallas, 1773, Reisen ii. Anhang p. 30

This species would naturally be expected to occur in the island, owing to its universal distribution.

Sokotra.—(Burr.)

Forficula, Linn.

2. *Forficula smyrnensis*, Serv. (Plate xxv. fig 5.)

Forficula smyrnensis, Serville, 1839, Orth., p. 33.

This pretty earwig has been taken at Constantinople and Athens, as well as from Asia Minor, and Brunner records it as far west as Corsica.

Sokotra: Dahamis.—1 ♂.

3. *Forficula lucasi*, Dohrn.

Forficula lucasi, H. Dohrn, Stett. ent. Zeit., xxvi, p. 98 (1865).

It is interesting to find this earwig in the island, for its distribution appears to be wide, though the insect is scarcely common. Dohrn

first described specimens from Syria (Mus. Paris), and it is known from Egypt. It was then taken by Fea in Burma, at Teinzo, and recorded by de Bormans. A still more remarkable locality, if it is a domesticated species, as it appears, is the road of Beni Mzab, on the road from Ghardaia to Guerrara in the Oued En-Nsa, and also in a house at Oued En-Nsa, in the Algerian Sahara, where it was taken by my friend Dr. Krauss.

Sokotra : Homhil (1500-2500 ft.).—1 ♂.

Anechura, Scudd.

4. Anechura fedtchenkoi (Sauss.).

Forficula fedtchenkoi, Sauss., 1894, in Fedtchenko, Turkestan, Orth., p. 6.

This is the most interesting of the earwigs taken in Sokotra, for it is unexpected. The species was originally described by de Saussure from specimens taken by Fedtchenko in Turkestan, and since then has apparently not been captured again. The Sokotran specimens I have submitted to my friend M. de Bormans, who informs me that they are of a variety which was taken with the type form in Turkestan. The wings are entirely hidden by the elytra and the forceps are flattened. The species seems to be incapable of flight, and it is most striking that so far it should have been found in Turkestan and Sokotra only ; doubtless it will some day be captured in intermediate localities.

Sokotra.—1 ♂, 1 ♀.

Anisolabis, Fieb.

5. Anisolabis stâli (Dohrn.).

Forcinella stâli, H. Dohrn, 1864, Stett. ent. Zeit. xxv., p. 286.

Described by Dohrn from Javanese specimens.

Sokotra : Hadibu (XII. 98), 1 ♂.

6. Anisolabis maritima, Bon.

Anisolabis maritima, Bon. in MS., 1852, Génér. Mon. Forf., p. 9.

These individuals seem to be a variety of *A. maritima*, and in doubt I have submitted them to M. de Bormans. They are "characterised by nothing ; antennæ with 23 segments, unicolorous, no rudiments of elytra, forceps ordinary, medium sized, feet unicolorous."

Sokotra.—3 ♀.

Six specimens received.

It is curious to note that the common *Forficula auricularia* does not seem to occur in the island.

BLATTODEA.

PHYLLODROMIIDÆ.

Phyllodromia, Serv.

7. Phyllodromia unicolor, Br.

Phyllodromia unicolor, Brunner, 1893, Rev. Orth., p. 18.

Phyllodromia sp., Burr, P.Z.S., 1898, p. 384.

This species was described first by Brunner from Mandalay. I refer the

larva from the same locality to this species, but it might well be that of *Ph. germanica* L.

This species was obtained also by Mr. Bennett.

Sokotra : Hadibu Plain (21. II. 99).—2 ♀. (XII. 98).—1 larva.

Loboptera, Brunner.

8. Loboptera peculiaris, Burr. (Plate xxv. fig. 8.)

Loboptera peculiaris, Burr, Bull. Liverp. Muss., ii. p. 42 (1899).

♂ Testaceous shining. Antennæ setaceous. Pronotum rounded in front, truncated posteriorly, narrower anteriorly than posteriorly. Meso- and metanotum transverse. Elytra lobiform, lateral, hardly surpassing the hinder margin of the mesonotum. Wings absent. Head testaceous, with a transverse black band between the eyes; face with two black longitudinal bands. Abdomen dilated, castaneous, the margins paler, with a black spot on each side of the segments. Feet pale; femora very spiny; tarsi armed with a minute pulvillus between the claws, the first segment longer than the three following taken together. Cerci short. Subgenital lamina of the ♂ triangular, transversely obtusely rounded.

Length of body, ♂ 11-12 mm., of pronotum 4.4-25 mm.; breadth of pronotum 5 mm.

This species differs from all its congeners by its light shining testaceous colour. The pad between the tarsal claws is also somewhat larger than in the other described species. The genus is essentially South European and Asiatic in distribution.

Sokotra.—3 ♂.

PERIPLANETIDÆ.

Periplanata, Burm.

9. Periplanata americana (Linn.).

Blatta americana, Linn., Syst. Nat., ii. 687 (1766).

This species is quite cosmopolitan.

Sokotra : Homhil (1500 ft., 22. I. 99).—1 ♂.

Periplanata americana (Linn.), var. brunnea, Klug.

Periplanata brunnea, Klug., M.S. in Burm. Hand., ii. p. 503 (1839).

Sokotra : Hadibu Plain (16. XII. 98).—1 ♀. (2. XII. 98).—1 larva.

MANTODEA.

MANTIDÆ.

Teddia, Burr.

Teddia, Burr, Bull. Liverp. Muss., vi. p. 42 (1899).

♂. Body slender, elongate. Eyes round, not tuberculate. Antennæ very slender. Pronotum elongated, making a small dilatation over the coxæ; the edges are denticulated, and the disc entirely granulated. Prosternum flattened, smooth, slightly granulated posteriorly. Elytra

and wings abbreviated; the latter dark testaceous, shaded with purple, the anal part with a large dark spot; the former short, testaceous, rounded at the apex. Feet slender; anterior coxæ long; anterior femora slender, straight, with five spines on the outer margin beneath, of which the last is the largest; there are six larger spines on the inner margin, alternated with six smaller; there are four discoidal spines, of which the first is the smallest, the third the largest; the first basal spine is not remote from the others. Anterior tibiæ with ten small spines on each side; intermediate and posterior tibiæ with three spinules at the apex; posterior tibiæ very finely denticulated or unarmed. Supra-anal plate large, dilated, narrow at the apex, elongate, compressed.

This new genus is probably peculiar to the island, owing to the abbreviation of the organs of flight. It is much more slender than its allies (*Fischeria*); the unarmed posterior tarsi distinguish it from *Ischnomantis*, *Fischeria* and *Sphendale*; the rounded supraanal plate ♂, from *Deiphobe* and *Eremoplana*; the long posterior femora from *Solygia*; and the general facies of the insect and its slenderness forbid its confusion with *Bolivaria*.

10. *Teddia dioscoris*, Burr. (Plate xxv. figs. 3, 3a, 3b.)

Teddia dioscoris, Burr, Bull. Liverp. Muss., ii. p. 42 (1899).

♂. Of medium stature, slender; colour fuscous, elytra testaceous; wings testaceous, shaded with purple. There is a variety with feet paler, shaded and banded with darker.

Length of body, ♂ 40-46 mm., of pronotum 12-13.5 mm., ditto, anterior part, 4-5 mm., ditto, posterior part, 8-8.5 mm., of elytra 5.25 mm., of anterior coxæ 7-8 mm., of anterior femora 8.5-9 mm., of anterior tibiæ 4-4.5 mm., of posterior femora 11.5-13.5 mm., of posterior tibiæ 13-15 mm., of posterior tarsi 5 mm.

Sokotra: Dahamis (500-1000 ft., 21. XII. 28), 2 ♂.

ACRIDIODEA.

TRUXALIDÆ.

Truxalis, Fabr.

11. *Truxalis nasuta* (Linn.).

Gryllus (Acrida) nasuta, Linn., Mus. Lud. Ulr., p. 118 (1764).

Truxalis nasuta, Burr, P.Z.S., 1898, 184.

The solitary larva which I recorded as this species, may very likely be the immature of the following.

12. *Truxalis ensis*, Burr. (Plate xxv. figs. 4, 4a.)

Truxalis ensis, Burr, Bull. Liverp. Muss., ii. p. 43 (1899).

♀. Green. Body extremely elongated, cylindrical. Head not sharply, ascending; antennæ long, flattened, the apical segments smaller, the antennæ longer than head and pronotum combined. Pronotum small,

cylindrical, neither constricted nor dilated posteriorly; the lateral carinae slightly undulating, slightly diverging posteriorly; the typical sulcus situated well behind the middle, sinuate; lateral lobes of the pronotum obtuse-angled in front, not rounded, its carinae almost parallel with the dorso-lateral carinae. Sternum strongly carinate in the middle. Elytra very long and narrow, sharply pointed at the extremity, green, the scapular area with oblique transverse veins somewhat remote from each other, and with a spurious vein. Wings brightly coloured, long and narrow, considerably shorter than the elytra, golden-yellow, tessellated with black, yellowish-hyaline at the extremity. Abdomen typical. Feet very long and slender; claws of the tarsi long, the pulvillus large.

Length of body, ♀ 53-63 mm., of antennae 2-4 mm., of head (from above) 14.5 mm., of pronotum 8.8-25 mm., of elytra 52-57 mm., of wings 46 mm., of posterior femora 37 mm., of posterior tibiae 36-75 mm.

This very fine species is even more slender and elongated than the other members of this extraordinary genus. Characteristic points are the length of the antennae which exceed the combined length of the head and pronotum, the golden-orange colour of the wings, with black tessellations, the narrow, almost cylindrical head and pronotum, and the great length of the elytra. It falls into Bolivar's subgenus *Truxalis sensu stricto*, into the group of *crocea*, Bol., with brilliantly coloured wings and carinated sternum.

Sokotra: Jena-agahan (1200 ft., 11. I. 99); Gebel Raggit (800 ft., 16. XII. 98),—2 ♀.

Epacromia, Fisch.

13. Epacromia thalassina (Fabr.).

Gryllus thalassinus, Fabr., Ent. Syst., ii. 57 (1793).

This is a south European species, but occurs in Africa at least as far south as Somaliland.

Sokotra: Homhil (1500 ft., 18. I. 99).—1 ♂, 1 ♀. Adho Dimellus (3500 ft., 11. II. 99), 1 ♂.

EUMASTACIDÆ.

Plagiotriptus, Karsch.

14. Plagiotriptus insularis, Burr. (Plate xxv. fig. 6.)

Plagiotriptus insularis, Burr. Bull. Liverp. Mus., ii. p. 44 (1899); id. An. Soc. Españ. N.H., 1899, p. 302.

♀. Small, testaceous. Pronotum higher than long, slightly produced in front; lateral lobes with hinder margin straight, the anterior margin sinuate; meso- and meta-nota visible. Anterior feet and middle tibiae and tarsi dark; posterior tibiae not lobed.

Length of body 13 mm. (♀), of pronotum (max.) 6 mm., of pronotum (min.), 3 mm.; height of pronotum 7 mm.; length of femora postica 8 mm.

This species is very considerably smaller than *P. hippiscus*. In the shape of the pronotum it approaches rather to *P. rotundifrons*, Burr, but is much smaller and less dark in colour.

Sokotra : Jena-agahan (2500 ft., 3. I. 99).

Phaulotypus, Burr.

Phaulotypus, Burr, Bull. Liver. Muss., ii. p. 44 (1899).

Pronotum covering the head, compressed, elevated, acuminate before and behind, strongly produced posteriorly, the upper margin of the crest equally rounded, with no veins, granulated. Elytra and wings absent. Head formed as in *Chorotypi*. Anterior and middle femora compressed but not dilated : posterior femora strongly compressed and dilated, the upper crest denticulate, and genicular lobes acuminate. Posterior tibiæ curved, not lobed, the terminal spurs on the outer margin very small, the inner spur large ; the first tarsal segment very finely eremulate. Face granulated. Male unknown.

This new genus can be easily distinguished from the other genera of the group *Chorotypi*. The shape of the pronotum, the absence of lobes on the posterior tibiæ, and the absence of organs of flight distinguish it at once.

15. *Phaulotypus granti*, Burr. (Plate xxv. fig. 7.)

Phaulotypus granti, Burr, Bull. Liverp. Muss., ii. p. 44 (1899) ; id. An. Soc. Españ. N.H., 1899, p. 303.

♀. Small, castaneous, unicolorous.

Length of body, ♀ 14 mm., of pronotum 9 mm. ; height of pronotum 5.5 mm. ; length of posterior femora 8.5 mm.

I have great pleasure in dedicating this curious little novelty to Mr. Ogilvie-Grant, who collected *Orthoptera* so assiduously in Sokotra.

ÆDIPODIDÆ.

Ædaleus, Fieb.

16. *Ædaleus senegalensis* (Kr.).

Pachytylus senegalensis, Kr., Orth. Seneg., p. 28 (1877).

This species is widely distributed through the Ethiopian and Oriental regions. Senegal, Ternate, and New Holland are given by de Saussure as localities. The three specimens from Sokotra are the type form, as originally described from Senegal by Dr. Krauss.

Sokotra : Elhè, Hadibu Plain (30. I. 99).—2 ♂, 1 ♀.

Dissosteira, Scudd.

17. *Dissosteira forbesii*, Burr. (Plate xxv. fig. 1.)

Dissosteira forbesii, Burr, Bull. Liverp. Muss., ii. p. 44 (1899).

♂ ♀. Colour testaceous ; head obtuse ; vertex depressed between the eyes, not carinate ; fastigium of the vertex scarcely divided from the fastigium of the face ; face strongly convex, carinate ; eyes large, round ;

antennæ fusco-testaceous, longer than the head and pronotum taken together; pronotum keeled, slightly constricted in the middle, the anterior border obtusely angled, the central keel subsinuate, not cut by the sulci; hinder border rectangular; lateral keels not very prominent; crest of the pronotum not deeply intersected in the middle by the typical sulcus; lateral lobes narrow. Elytra long, obliquely subtruncate at the apex, fusco-testaceous, with three dark bands, coriaceous, closely and irregularly reticulated, hyaline only in the apical third, where the reticulation is open and regular, marked with a few dark spots; vena intercalata nearly straight, near to the radial vein. Wings shorter than the elytra, narrow, deep purplish-black, the apical part excepted, hyaline, the apex itself smoky; this hyaline and smoky part including the two apical lobes. Abdomen black; valves of the ovipositor short. Feet testaceous or fuscous. Posterior femora very stout, fusco-testaceous outside, purple inside, with two pale spots above, and a pale ring at the apex; the upper crest slightly denticulate; knees spotted with black on the inside. Posterior tibiæ black at the base, ringed with testaceous, then sanguineous, the spines dark at the apex, being 10 on each side, of which 1-3 are the smallest.

Length of body, ♂ 23.5 mm., ♀ 30 mm.; of pronotum, ♂ 5.5 mm., ♀ 6.5-6.75; of elytra, ♂ 24 mm., ♀ 33 mm.; of femora postica, ♂ 14.75 mm., ♀ 16.75 mm.

This species may be recognised at once by the inky black wings, with only a small clear band just before the apex, which is smoky. Its affinities are American, but one species of the genus (its arrangement in this genus is, however, provisional), *D. saucia*, occurs in Southern Africa.

Sokotra: Homhil (2500 ft., 22. I. 99).—1 ♂, 1 ♀. Goahal Gorge (16. I. 99) (200 ft., 27. I. 99).—1 ♀. Adho Dimellus (3500 ft., 11. II. 99).

Acrotylus, Feib.

18. Acrotylus longipes (Charp.).

Edipoda longipes, Charp., Orth. descr. et dep., tab. 54 (1845) (?).

Sokotra.—(Bennett.)

This is the form with the red wings.

PYRGOMORPHIDÆ.

Poecilocerus, Serv.

22. Poecilocerus sokotranus, Burr.

Poecilocerus sokotranus, Burr, P.Z.S., 1898, p. 384.

This species appears to be common in the island, and is apparently restricted to Sokotra. The peculiar dorsal tubercles to which I have referred (*P.Z.S.*, 1898, p. 385) are present on all the specimens, and seem to be organic, and not a foreign body, as previously suggested. They have since been discussed by Krauss (*Zool. Anzeiger*

xxiii. No. 610, March, 1900). The genus contains five other species, found in Tranquebar, Somaliland, and Egypt.

Sokotra : Kamahanu (500 ft., 30. XII. 98).—1 ♂, 2 ♀. Homhil (1500 ft., 18. I. 99).—1 ♂. Adda Valley, east of Hadibu Plain (29. I. 99).—1 ♀. Dahamis (1000 ft., 23. XII. 98).—1 ♂.

Mr. Bennett also obtained this species.

ACRIDIIDÆ.

Oxya, Serv.

23. *Oxya vicina*, Br.

Oxya vicina, Brunner, Rev. Orth., p. 152 (1893).

This species is very widely distributed, but only hitherto recorded, so far as I am aware, from the Oriental region. Brunner mentions China, Hainan, Japan, and the Himalayas as localities from which he possesses examples.

Sokotra : Hadibu Plain (22. XI. 99).—1 ♀. Homhil (1500 ft., 18. I. 99).—1 ♀.

Cataloipus, Bol.

24. *Cataloipus oberthuri*, Bol. (Plate xxv. figs. 2, 2a.)

Euprepocnemis (Cataloipus) oberthuri, Bol., An. Soc. Españ., N.H., xix p, 321 (1890).

This fine grasshopper is rare, and only known elsewhere from Tabora, in Uvanyembe. The genus is characteristically African. *C. oberthuri* is very close to *cymbifera*, Kr., but may be distinguished by the form of the subgenital lamina of the male, which is rounded, with a slight rounded emargination in *cymbifera*, but strongly excised with triangular lobes in *oberthuri*.

Sokotra : Hadibu Plain (20. II. 99).—1 ♂, 1 ♀. Homhil (1500 ft., 18. I. 99).—1 ♂, 2 ♀; and (2500 ft., 22. I. 99).—1 ♀.

Caloptenus, Burm.

25. *Caloptenus italicus* (Linn.).

Gryllus italicus, Linn., Syst. Nat., ii. p. 701 (1766).

This specimen differs from the ordinary forms of *C. italicus* in the colour of the posterior femora. These are dark and bright purple on the inner side; the inferior sulcus is light purple, the outer inferior sulcus is pale; the posterior tibiae and tarsi are yellowish; the pronotum, too, is produced further posteriorly than in the typical forms. Another point is that the lower margin of the lateral lobes of the pronotum are slightly convex, in the type, but in this specimen they are straight. *C. italicus* is an extremely variable species, and I therefore hesitate to describe this as new. It is essentially a European form, but occurs also in Syria, and has been taken at Khartoum.

Sokotra : Elhé, Hadibu Plain (30. I. 99).

Acridium, Geoff.

26. *Acridium tataricum* (Linn.).

Gryllus (*Locusta*) *tataricus*, Linn., Syst. Nat. (ed. x.), i. p. 432 (1758).

Sokotra : Goahal Gorge (200 ft., 27. I. 99).—1 ♀.

27. *Acridium tataricum*, Linn. var. *mœstum*, Serv.

Acridium tataricum var. *mœstum*, Serv., Orth., p. 654 (1839).

Sokotra : One specimen—(*Taschenberg*).

28. *Acridium*, sp.

Sokotra : Jena-agahan (1200 ft., 1. I. 99) ; Homhil (1500 ft., 18. I. 99).

These specimens are all in the larval stage, and it is impossible to determine the species with precision.

Mr. Bennett also collected this species.

LOCUSTODEA.

PHANEROPTERIDÆ.

Phaneroptera, Serv.

29. *Phaneroptera nana*, Charp.

Phaneroptera nana, Charp., Fieb., Syn., p. 49 (1853).

It is impossible to determine with any degree of satisfaction the species of this genus without examining the male, but these specimens are extremely probably *Ph. nana*, an insect which has a wide distribution in Africa and Southern Europe.

Sokotra : Hadibu Plain (11. XII. 98), 1 ♀ ; Jena-agahan (1200 ft., 2. I. 99), 1 ♀.

30. *Phaneroptera*, sp?

Sokotra.—Three examples (*Taschenberg*). Probably to be referred to the above.

MECOPODIDÆ.

Pachysmopoda, Karsch.

31. *Pachysmopoda abbreviata* (Tusch.).

Mecopoda abbreviata, Tusch., 1883, Zeitschr. für. Naturw., lvi. p. 184.

Mecopoda (*Pachysmopoda*) *abbreviata*, Karsch., 1886, Berl. Ent. Zeit., p. 114. Taf. iv. fig. 2, ♀.

Pachysmopoda abbreviata, Kirby, W.F. 1892, Trans. Ent. Soc. Lond., p. 409 ; Karsch, 1892, Berl. Ent. Zeit., p. 342.

Pachysmopoda abbreviata, Redt., Mon. Uebersicht. Mecop., 1892, p. 216.

Pachysmopoda abbreviata, Burr, 1898, P.Z.S., p. 384—note.

Green or testaceous. Antennæ pale ringed. Head stout, strongly punctate. Pronotum with the disc and lateral carinæ dark. Elytra with anterior and intermedial area, black and white spotted. Posterior knees dark.

	♂	♀
Length of pronotum.....	10 millim.	12 millim.
" elytra.....	27 "	33 "
" posterior femora...	28 "	34 "
" ovipositor.....	—	25.5 "

This is a very fine species. So far, the only specimens known to be in existence in collections, appear to be the types ♂, ♀, of Taschenberg, which are in the Berlin Museum. Karsch has redescribed it, and given a figure of the female. In the dried specimens, the under side of the posterior femora is dull, testaceous, or fuscous, but in one example in spirits, the inferior sulcus is bright purple; the antennae scarcely show any traces of the pale rings, but the colour of the living animal is very different from that of the dried specimen. According to the descriptions and Karsch's figure, the elytra exactly reach the apex of the abdomen, but in the examples which I have been able to examine they are invariably considerably longer; this is probably due to the contraction of the body.

The *Mecopodidae* are a small family characteristic of the Ethiopian and Oriental Regions.

Sokotra: Jena-agahan (1. I. 99), 1 ♂, 2 ♀; Dahamis (350 ft., 22. XII. 98), 2 ♂; and (500 ft., 24. XII. 98), 1 ♂; Homhil (2500 ft., 26. I. 99); and (1500-2500 ft.)

GRYLLODEA.

GRYLLIDÆ.

Liogryllus, *Sauss.*

32. *Liogryllus bimaculatus* (*de Geer.*).

Gryllus bimaculatus, de Geer, Mem., p. 521 (1773).

This species is distributed throughout Africa, Southern Europe, Central Asia, India, and the Malay Archipelago.

Sokotra: Jena-agahan (1200 ft., 1. I. 99), 1 ♂, 1 ♀; Elhé, Hadibu Plain (30. I. 99), 1 nymph.

Gryllus, *Linn.*

33. *Gryllus lepidus*, *Walk.*?

Gryllus lepidus, Walk., Cat. Derm. Salt., p. 46 (1869).

I am not certain as to the identity of this species, having only females to examine.

Sokotra: Homhil (1500 ft., 18. I. 99), 2 ♀ (20. I. 99), 1 ♀.

Cophogryllus, *Sauss.*

34. *Cophogryllus*, *sp.*?

Sokotra.—One example (*Taschenberg*).

Landreva, Walk.

35. Landreva, sp. n. ?

Sokotra (*Burr*).

ÆCANTHIDÆ.

Æcanthus, Serv.

36. Æcanthus pellucens (Scop.).

Gryllus pellucens, Scop., Ent. Carn., p. 32 (1763).

This delicate little cricket is extremely common in Southern Europe, but is represented in the Oriental Region by *O. rufescens*, Serv. *O. pellucens* is distinctly a Palearctic species.

Dinehan Valley (3000 ft., 1. II. 99), 1 ♀.

II.—Grasshoppers from Abd-el-Kuri.

ACRIDIODEA.

ÆDIPODIDÆ.

Sphingonotus, Fieb.

Sphingonotus cærulans (Linn.), var.

Gryllus (*Locusta*) *cærulans*, Linn., Syst. Nat., i., part ii. p. 701 (1766).

Abd-el-Kuri (22. II. 99) 4 ♂, (5 XII. 98) 1 ♂.

Sphingonotus savignyi, Sauss.

Sphingonotus savignyi, Sauss., Prod. Œd., p. 208 (1888).

Abd-el-Kuri (5. XII. 98).

PYRGOMORPHIDÆ.

Pyrgomorpha, Serv.

Pyrgomorpha cognata, Krauss.

Pyrgomorpha cognata, Krauss, Orth. Seneg., p. 30 (1877).

This species is essentially African, having been noticed hitherto from Senegal and Dagana. The genus is widespread, there being two Palearctic species, two American, several Ethiopian, and one or two Indian and Asiatic representatives.

Abd-el-Kuri (5. XII. 98).

[Our stay in Abd-el-Kuri was so short that we obtained, I have no doubt, but a few of the species of *Orthoptera* that the island contains.—*H.O.F.*]

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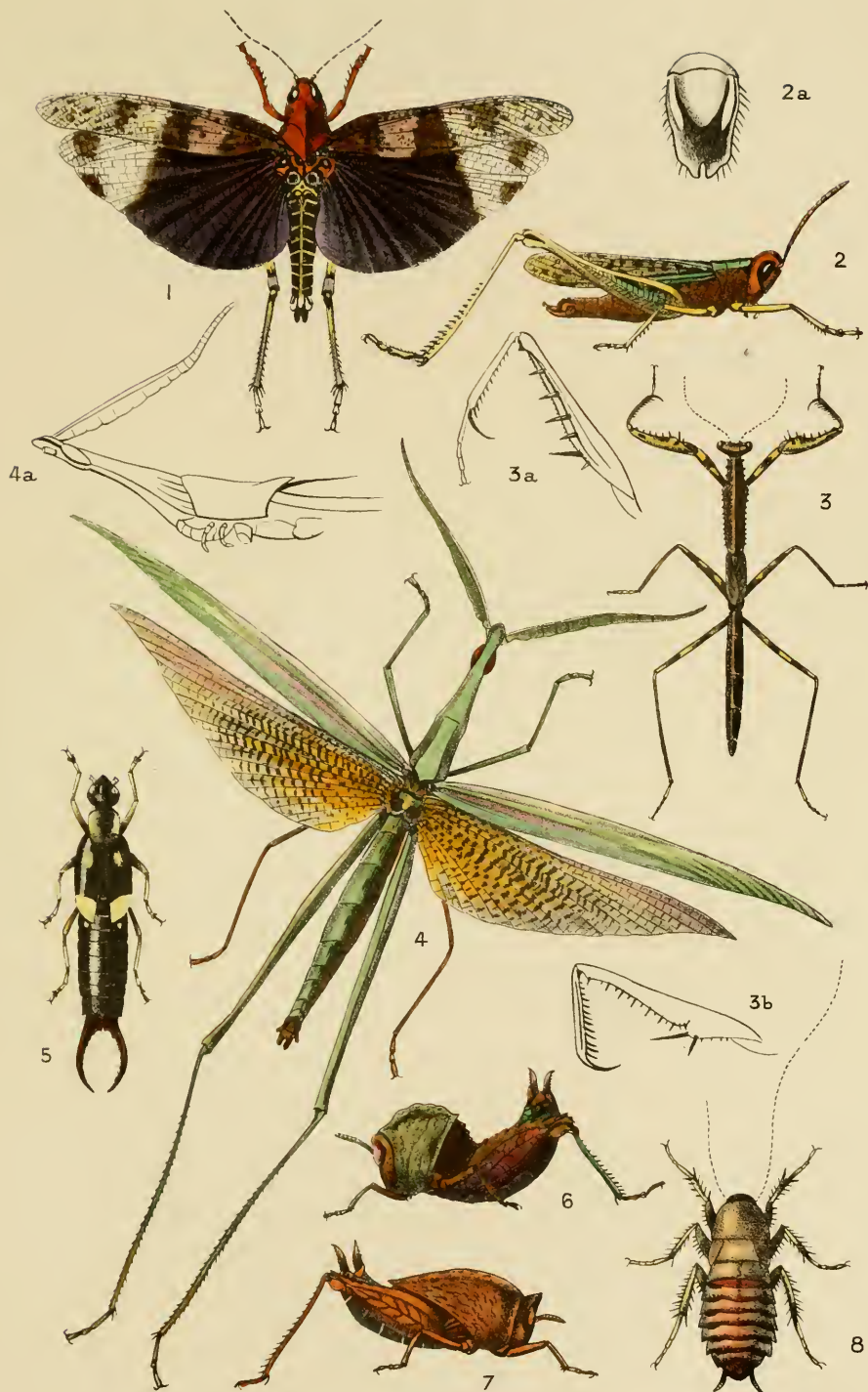
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PLATE XXV.

- Fig. 1..... DISSOSTEIRA FORBESII, *Burr*, ♀, p. 418.
- Fig. 2..... CATALOIPUS OBERTHURI, *Bol.*, ♂, p. 420.
- Fig. 2a. *The same, subgenital lamina, ♂.*
- Fig. 3..... TEDDIA DIOSCORIS, *Burr*, ♂, p. 416.
- Fig. 3a. *Anterior foot, internal surface.*
- Fig. 3b. *Anterior foot, external surface.*
- Figs. 4, 4a. TRUXALIS ENSIS, *Burr*, p. 416.
- Fig. 5..... FORFICULA SMYRNENSIS, *Serv.*, ♂, p. 413.
- Fig. 6..... PLAGIOTRIPTUS INSULARIS, *Burr*, ♀, p. 417.
- Fig. 7..... PHAULOTYPUS GRANTI, *Burr*, ♀, p. 418.
- Fig. 8..... LOBOPTERA PECULIARIS, *Burr*, p. 415.



ARTHROPODA.

Myriapoda.

By R. I. POCKOCK.

PLATE XXVI.

Centipedes and Millepedes.

So far as individuals are concerned, Centipedes are abundant in the island of Sokotra. The species, however, are few in number, six only being known up to the present time. With the exception of the *Cryptops*, which was met with but once, all the species seem to be distributed everywhere throughout the island, occurring both in the Hadibu Plain and at all altitudes up to 4000 feet, *Scolopendra valida* being the dominant form.

The relationship of the fauna to that of the surrounding areas presents some interesting anomalies. In the first place, it is not a little singular that the genus *Rhombophephalus** is altogether absent, although it is represented by several indigenous species in the Mediterranean and Oriental Regions. Similarly the genus *Lithobius*, a typical Palearctic and North American genus, is absent; and no trace was found of *Scutigera*, which is universally distributed south of the 45th parallel of N. latitude.

The two species of *Scolopendra*, namely *calida* and *balfouri*, belong to a genus which is now restricted in its range to the Mediterranean, Neotropical, and Sonoran Regions. The distribution and names of the species in the Mediterranean Region are as follows:—*S. valida*, Canary Islands and Sokotra; *S. balfouri*, Sokotra and Abd-el-Kuri; *S. deserticola*, S. Arabia and Somaliland; *S. persica*, Persian Gulf.† The genus *Asanula* has, in addition to the Sokotran species, a form belonging to the Himalayan and Burmese fauna.

* This term is here used for the first time in a sense that requires explanation. The genus *Scolopendra*, as hitherto recognised by the majority of writers, is divisible into two sections dependent upon the presence or absence of a transverse groove on the first tergal plate. Newport, who was the first to dismember *Scolopendra*, as limited by Leach, gave the name *Rhombophephalus* to a species of the section in which the groove is absent, namely, to the young of *S. cingulata*, Latreille (see Pocock, *Ann. Mag. Nat. Hist.* (6), vii., p. 53, 1891). Although based on a fortuitous and valueless character, the name must stand for the section named *Calcaria* by Porat, of which *cingulata* is a representative, if the section be accorded generic or sub-generic rank. The term *Scolopendra* can thus be retained by elimination for the section, named *Collaria* by Porat in 1876, which has the first tergal plate sulcate, with *S. gigantea*, Linn., as the Type.

† Pocock, *Journ. Linn. Soc., Zool.*, xxv. p. 297 (1896).

Rhysida is distributed in Algeria, Somaliland, the Oriental Region, and Central America. *Cryptops* is cosmopolitan, and *Mecistocephalus* is a northern type which, although abundant in the tropics, does not for the most part penetrate far into the Southern Hemisphere.

The most singular fact connected with the Millepede fauna (Diplopoda) of Sokotra is the entire absence, or, at all events, the great scarcity, of all forms belonging to the Iuloidea. It is possible, of course, that some obscure species of the group were overlooked: but it is certain that none occur in any abundance.

Three species only were obtained, all belonging to the Polydesmoidea. Although one of these species differs from the others, and indeed from all previously described species, in a character—namely, the absence of pores from the seventh somite—which must be considered of generic value, there is no doubt that the three are closely related, as is attested in particular by the structure of the copulatory organs of the male. The two species which have a normal pore formula also constitute a peculiar genus, which in one particular resembles *Pontoria*—a genus characteristic of the Sonoran region of North America. This resemblance, however, is probably due to convergence rather than to actual relationship.

It cannot be said that these species throw any light upon the origin of the fauna of Sokotra since they present no particular resemblance to the genera known from any of the adjoining areas.

That none of the species recorded in the following pages have been artificially introduced into Sokotra is shown by the absence from the island of all the species of Arachnida and Myriapoda, such as *Rhomboccephalus morsitans*, *Orthomorpha courretata*, *Isometrus europæus*, and *Heteropoda venatoria*, which the development of commerce has now spread all over the tropics. This fact, coupled with the peculiarity of most of the species, enforces the conclusion that Sokotra gained its present Myriopod population at a remote period when the island formed part of the continent of Arabia or Somaliland.

I.—The Centipedes of Sokotra.

CHILOPODA.

SCOLOPENDROMORPHA.

SCOLOPENDRIDÆ.

The genera of the family represented in Sokotra may be tabulated as follows:—

- | | |
|--|----------------------|
| (a) Seventh somite with a pair of stigmata | <i>Rhysida</i> . |
| (b) Seventh somite without stigmata. | |
| (a ¹) Anal somite large, with exposed porous pleura
and spiny legs, 1st tergite transversely
sulcate | <i>Scolopendra</i> . |

- (b¹) Anal somite small, with pleura largely concealed and poreless; anal legs unspined;
1st tergite not transversely sulcate *Asanada*.

Scolopendra, Linn.

One species of this genus figures in Taschenberg's list under the name *Collaria morsitans*, with *Scolopendra crudelis* and *complanata* as synonyms. There is no reason to doubt that Riebeck's specimens thus identified and synonymised by Karsch are specifically identical with either one or both, probably both, of the species recorded below. It is certain also that they are not referable to the same species as the types of *S. complanata* and *crudelis*, which belong to the older species *S. alternans*, Leach—a common West Indian form. The same may be said of the Sokotran specimens in the Bremen Museum, referred by Karsch to *Collaria morsitans* (Abh. Nat. Ver. Bremen, ix. p. 67, 1884).

1. Scolopendra balfouri, Poc. (Plate xxvi. fig. 5.) See p. 208.

Collaria morsitans, Karsch, Abh. Nat. Ver., Bremen, ix. p. 67 (1884).

Scolopendra valida, subsp. *balfouri*, Pocock, Journ. Linn. Soc. Zool., xxv. p. 297 (1896).

The specimens of *Scolopendra* collected in Sokotra by Professor Balfour were sent to the British Museum in 1881, and were examined and described by me as conspecific with a species known at that time only from the Canary Islands—namely, *Scolopendra valida*, of Lucas (see *Ann. Mag. Nat. Hist.* (6), i. p. 335, 1888). Subsequent examination of the same material convinced me that, at all events, the larger specimens found in Sokotra are distinguishable both by size and colouring from Canary Island specimens, although the smaller Sokotran specimens, which I took to be the young of the larger, appeared to be inseparable from them. Hence I proposed the name *balfouri* as a subspecific term for the Sokotran form (*Jour. Linn. Soc. Zool.*, xxv. pp. 297-298, 1896). The mass of material brought back by Messrs. Grant and Forbes has developed our knowledge of the subject still further, and has convinced me that it was an error to regard the small specimens of *Scolopendra* taken by Balfour as the young of the larger, and that, as a matter of fact, two closely allied species of this genus inhabit the island, the larger of the two being *S. balfouri* and the smaller *S. valida*, there being practically no constant character by which the latter can be distinguished from the Canary Island species.

The young of *S. balfouri* are entirely pale, but in adult specimens, which may reach a length of 190 mm., the head, antennæ, and all the legs are green, or even black, and although the posterior half of the trunk is paler, the anterior half is distinctly olivaceous or olivaceo-castaneus. Sokotra: Homhil (1500-2500 ft.); Dahamis (350-1000 ft.); Monkaradia (=Gebel Raggit (800 ft.); Jena-agahan (1200-2500 ft.); Hadilu Plain.

Professor Balfour and Dr. Riebeck both obtained this species, but no locality beyond "Sokotra" is given.

2. *Scolopendra valida*, Lucas.

Scolopendra valida, Lucas, in Webb and Berthelot, Hist. Nat. des Iles. Canaries, ii., Entoml., p. 49, pl. vii. fig. 14 (1836-1844); Newport, Tr. Linn. Soc., xix. p. 402 (1845); Pocock, Ann. Mag. Nat. Hist. (6), i. pp. 335-338 (1888) (in part, specimens from Canary Islands); Id., Journ. Linn. Soc. Zool., xxv. p. 297 (1896).

Sokotra: Homhil (1500-2500 ft.); Dahamis (350-1000 ft.); Jena-agahan (1200-2500 ft.); Adho Dimellus (3500-4000 ft.); and Hadibu Plain.

Both Professor Balfour and Dr. Riebeck collected this species in "Sokotra" without further locality.

The characters of the two above-mentioned species may be tabulated as follows:—

- | | |
|--|-------------------|
| (a) Total length up to about 180 mm. (9 inches); legs and antennæ violet-green in adult; the whole body a darker olive-brown, increasing in intensity at the anterior and posterior extremities; anal legs long and slender, the segments more than twice as long as broad; antennæ long, about four times as long as the head | <i>balfouri</i> . |
| (b) Total length up to about 80 mm. (3½ inches); legs yellowish or pale green; head, antennæ, and anal legs yellowish or yellowish-brown; anal legs short and thick, the segments less than twice as long as broad; antennæ short, only about three times as long as the head | <i>valida</i> . |

Rhysida, Wood.

3. *Rhysida longicornis*, Pocock.

Rhysida longicornis, Pocock, Ann. Mag. Nat. Hist. (6), vii. p. 60, pl. iv. fig. 5 (1891).

Colour olive brown with metallic lustre; antennæ yellowish, darker at base; legs yellowish or bluish-green, the posterior pair turquoise-blue. *Head* sparsely punctured; antennæ, composed of 20-22 segments, long, reaching (when extended laterally) past the 8th tergite, the basal three segments naked, the rest covered with yellowish pubescence. *Precoaxal plates* of maxillipedes armed with four black conical teeth; process on femur tridentate. *Tergal plates* smooth, from the 5th bisulcate, from the 9th-11th marginate. *Sternal plates* furnished with only two very short sulci in front. *Anal tergite* without median sulcus; *pleura* with process armed with 3 apical, 1 lateral and sometimes 2 small superior spines; *legs* very long and slender, not much less than half the length of the body, femur armed in its basal half with 8-13 spines, 3 of which form a row beneath, the rest less regularly arranged above

and below on the inner side ; protarsal segment unspined. Protarsi of remaining *legs* spurred beneath, those at the anterior half of the body spurred in front as well.

Length up to about 55 mm.

Sokotra : Jena-agahan (120-1500 ft.) ; Dahamis (350-1000 ft.) ; Moukaradia (= Gebel Raggit (600 ft.) ; Adho Dimellus (3000-4000 ft.) ; and Homhil.

Professor Balfour also collected this species.

***Asanada*, Meinert.**

Asanada, Meinert, Trans. Amer. Phil. Soc., xxiii. p. 189 (1886) ; Pocock, Ann. Mag. Nat. Hist. (6), vii. p. 229 (1891).

4. *Asanada socotrana*, Pocock.

Asanada socotrana, Pocock, Bull. Liverpool Mus., ii. p. 9 (1890).

Colour a tolerably uniform yellowish-green, with the head plate and maxillipedes tinted with reddish-brown. *Head* and *maxillipedes* smooth, the latter strong, the coxal plates armed with three sharp teeth ; antennae short, composed of 17 segments, reaching to the end of the first tergite. The 1st *tergite* not sulcate, 2nd at most obsoletely, 3rd weakly sulcate, the rest strongly bisulcate, laterally punctate or subrugulose, margins not raised. *Sterna* smooth, bisulcate. *Anal somite* with small tergum, very small pleura, and large wide sternum, the latter wider than long, wider than the sternum of the preceding somite, and with its posterior margin very lightly convex. *Legs* ; anal very thick, patella sulcate above in its distal half ; protarsal and tibial segments of *legs* without spurs.

Sokotra : Homhil (1500-2500 ft.) ; Dahamis (350-1000 ft.) ; Jena-agahan (120-2500 ft.), Hadilm Plain.

Only one other species of the genus *Asanada* has hitherto been discovered.

This is *A. brevicornis* of Meinert, which forms part of the Himalayan and Burmese fauna of British India. The existence of the genus in Sokotra also is a most interesting discovery.

The Sokotra species differs from the Indian in having the anal sternum transversely oblong instead of semicircularly rounded, the antennae longer and much more attenuated, the apical segment being much longer than wide.

CRYPTOPIDÆ.

***Cryptops*, Leach.**

5. *Cryptops socotrensis*, sp.n.

Colour uniformly pale yellow. *Antennae* composed of 17 segments, those in the distal half moniliform. *Head* with a pair of abbreviated sulci behind, its posterior border transversely truncate, overlapping the 1st tergite. *First tergite* with a deep, lightly procurved transverse sulcus in front and a pair of longitudinal sulci ; 2nd tergite also with pair of

sulei; the rest and the sternites normally sulcate. *Legs* armed with strong spiniform setae. *Anal somite* with a few similar setae; anal legs strongly armed below and internally, except in the distal segments, with stiff spiniform setae, the distal segments furnished with finer setae; femur armed above on the inner side at apex with a strong curved spur, a similar but smaller spur on the apex of the upper side of the patella externally, and two larger and stronger upon the posterior end of the tibia, the posterior end of the protarsus angled but not spurred apically above; tibia armed below with a series (6) of short spiniform teeth, the protarsus with a pair of stronger teeth, the proximal of which is the larger.

Length about 16 mm.

Sokotra: Adho Dimellus (3000-4000 ft.).

This species may be recognised by the spine-armature of the anal legs.

Only one specimen was obtained.

GEOPHILOMORPHA.

DICELLOPHILIDÆ.

Mecistocephalus, Newport.

6. *Mecistocephalus punctifrons*, Newport.

Mecistocephalus punctifrons, Newport, Proc. Zool. Soc., p. 179 (1842); id. Tr. Linn. Soc., xix. p. 429 (1845), and of subsequent authors.

Sokotra: Hadibu Plain; Dahamis (350-1000 ft.); Jena-agahan (1200-2500 ft.); Homhil (1500-2500 ft.); and Adho Dimellus (3000-4000 ft.).

This species, which is common in the Oriental region and has also been recorded from Somaliland, was the only representative of the long vermiform centipedes that was met with in Sokotra.

DIPLOPODA.

POLYDESMIDÆ.

By their generic and specific features the males of the three Sokotran species of this family may be diagnosed as follows:—

- (a) Keels of seventh somite without pores; trochanters of legs with scarcely a trace of spiniform process, merely angular at their distal extremity; first tergite with its anterior border lightly emarginate laterally; tergites scarcely granular; keels of anterior somites not laterally emarginate, as in *F. forbesii*; copulatory organ more like that of *F. socotrensis*. *Aneptoporus granti*.
- (b) Keels of seventh somite with pores; trochanters distinctly spined; first tergite with anterior border evenly convex from side to side.
- (c) Colour redder; lateral border of keels of

second to fifth somites lightly emarginate ; keels larger, and with thicker margins ; tergites with row of granules or small tubercles along posterior border ; external curled branch of copulatory organ very stout ; the two processes of the submembranous inner branch subequal in length

Fontariopsis socotrensis.

(*b*.) Colour browner ; lateral border of keels not emarginate ; keels smaller and with thicker edges ; no tubercles on tergites ; external branch of copulatory organ small and slender ; two processes of membranous piece very unequal

Fontariopsis forbesii.

Fontariopsis, gen. nov.

Antennae about as long as width of body in ♀, exceeding it by as much as one-fourth of the width in ♂, not visibly incrassate, the segments from 2-6 subequal in length, gradually thickened distally. *Head* smooth, with frontal sulcus. *First tergite* as wide as the second, with laminate expansion. Remaining *tergites* smooth, or sparsely granular laterally and posteriorly, convex, not sulcate ; the groove defining the cylindrical portion not sculptured. *Caudal process* trapezoidal, narrowed posteriorly, truncate along the posterior margin between the two tubercles ; a lateral tubercle on each side. *Keels* of moderate size, rising above the middle of the side, horizontal, with posterior angle acutely produced, anterior angle widely obtuse and rounded, lateral margin thickened, posterior margin toothed or tubercular. Lateral surface of segments granular. *Sterna* broad, unarmed ; the last narrowed between the legs of the last pair, the interval being equal to about the length of the coxa and trochanter of one of the legs. *Legs* with trochanters longer than coxae, and armed with a spike, as in the Central American genus *Fontaria*. *Anal sternite* twice as broad as long, semi-circularly triangular, its sides lightly convex, apex obtusely angular ; a low tubercle on each side between the apex and the base.

♂ *Copulatory organs*, when at rest, projecting, straight forward, parallel, complicated, consisting of two main portions, an admedian which is distally membranous and divides into an outer and an inner branch, and an external or a median which is composed of two branches, an external, simple and sinuous, curving round the base of the internal, which is apically bifid. *Sternum* of sixth somite lightly hollowed behind for the reception of the apices of the copulatory organs. No process on sixth or fifth sterna.

Type *F. socotrensis*.

This genus resembles *Fontaria* only in the presence of a spike on the lower side of the distal end of the trochanter of the legs. It differs in the form of the keels, of the copulatory organs, &c.

7. *Fontariopsis socotrensis*, *sp. n.*

♀ Colour blood-red, very like that of *Aneptoporus granti*, described below, but with the legs, sterna, and antennae paler yellow. Allied in general characters to *A. granti*, but the anterior border of the *first tergite* is evenly convex from angle to angle, the keels are larger, and those of somites 2 to 5 lightly emarginate; and the median and posterior terga, especially the latter, furnished along the posterior border with a distinct row of small granuliform tubercles. *Caudal process* broader across the middle and more abruptly narrowed than in *A. granti*. *Anal sternite*, not so distinctly triangular.

♂ Differing from the ♀ of *A. granti* in the same general features as does the ♀. Copulatory organs very similar to those of *A. granti*, but the external branch much stouter, thick and rounded throughout, with the apex not abruptly expanded.

♀ Total length 29 mm., width 4·8 mm.

Sokotra: Gebel Raggit (600 ft.).

The specimens of this species occurred at Gebel Raggit with those of *A. granti* taken at the same place. So similar in general form and colouring are the two that on the first cursory examination to which they were submitted they were all ascribed to the same species and and described as *Odontopeltis granti*.

8. *Fontariopsis forbesii*, *Pocock*.

Odontopeltis forbesii, Pocock, Bull. Liverp. Mus., ii. p. 9 (1898).



FIG. a.—LOWER VIEW OF RIGHT COPULATORY ORGAN OF
Fontariopsis forbesii.

♂ Larger and darker in colour than *F. socotrensis*, the prevailing tint being brownish and not pinkish-red. Keels of *somites* 2 to 4 not emarginate along the lateral border; terga without granules; keels thicker on the margin, more depressed, the anterior angle less prominent.

Copulatory organ (fig. a) very different, the external branch small and slender, and the principal branch of the membranous sclerite much longer than the smaller pointed branch.

Total length 31 mm., width 5.5 mm.

Sokotra : Adho Dimellus (3500-4800 ft.).—A single male example.

***Aneptoporus*, gen. nov.**

Closely allied to the preceding genus *Pontariopsis*, as indicated by the form of the keels and of the copulatory organs, but distinguishable by the almost complete absence of the spike on the trochanters, and above all by the absence of pores from the seventh somite—a feature in which it differs from all the hitherto described genera, the pore formula being 5, 9, 10, 12, 13, 15, 19.

Type *A. granti*, Pocock.

9. *Aneptoporus granti*, Pocock.

Odontopeltis granti, Pocock, Bull. Liverp. Mus., ii. p. 9 (1898).



FIG. b.—LOWER VIEW OF RIGHT COPULATORY ORGAN OF
Aneptoporus granti.

♀ *Colour* blood-red, with darker but indistinct median dorsal line ; legs generally paler yellow, sometimes as dark as the dorsal surface ; sterna pale. First *tergite* with anterior border lightly but distinctly emarginate at the sides, the posterior border similarly but less distinctly emarginate, hence the lateral expansion is clearly defined. Second and third *tergites* with margin of keel strongly thickened in its posterior half, posterior angle slightly acute, the anterior and posterior edges scarcely dentate. The rest of the *keels* strongly produced and spiniform posteriorly, those in the middle of the body the largest : the anterior portion of those at the posterior end much reduced : the posterior border of the keels from the fourth, sixth, seventeenth or eighteenth denticulate or tubercular : the anterior, border from the fifth to the twelfth or thirteenth also denticulate, but

more weakly so. No tubercles on the terga, or, at most, a few at the posterior end of the body. *Caudal process* triangular and truncate, its sides evenly converging. *Anal sternite* nearly rectangular and pointed. Coxae and trochanters of *legs* furnished with a long bristle; a row of longish hairs along the posterior border of the sterna. ♂ Smaller than female. Legs thicker. *Copulatory organ* as in fig. 6; the external branch with apex expanded, the two processes of the membranous piece not very unequal in length.

♀ Total length 27 mm., width 4.3 mm.

Sokotra: Dahamis (350-1000 ft.); Gebel Raggit (600 ft.); Homhil (1500-2500 ft.); Jena-agahan (1200-2500 ft.).

II.—The Centipedes of Abd-el-Kuri.

SCOLOPENDRIDÆ

Scolopendra, *Linn.*

Scolopendra balfouri, *Por.*

Scolopendra valida, sub sp. *balfouri*, Pocock, Journ. Linn. Soc. Zool., xxv.
p 297 (1896).

(See p 431.)

ANNULATA.

Hirudinea:
Chætopoda.

Note by HENRY O. FORBES, LL.D.

Leeches and Worms.

Only two species belonging to the *Annulata* were collected during our expedition, and both only in Sokotra. The first belonged to the order **Hirudinea**. During the skinning of a batch of Sokotran Gros-beaks (*Rhychostruthus sokotranus*) by our taxidermist Cutmore, my attention was drawn by him to a small species of leech which he found occupying the nasal chambers of many of these birds. From an ocular examination of them in life, they appeared to me from their form, attitudes, and mode of movement, to belong to a specially small species of *Hemadipsa*; at all events, from the absence of any sign of proboscis, they would seem certainly to be Gnathobdellids. It was impossible to determine whether they were present in the nostrils of these birds accidentally and temporarily (the bird being able to remove them at will), or whether they have become, as their presence in so many individuals would suggest, a sort of internal parasite in the way that the Horse-leech *Hemopsis* may infest the pharyngeal passages of cattle, and *Hirudo sanguisuga* has been occasionally known to attack the human subject. No *Hemadipsæ* were observed by us on the vegetation or elsewhere in any part of the island we visited. I do not remember, also, ever to have met with leeches in the nostrils, or even on the bodies, of birds taken in the Malayan forests, where *Hemadipsæ* occurred frequently enough in thousands.

The second Annulate we encountered was an **Oligochæte** living in the humid, sandy earth of the morassy bank of the Hanefu river, a short distance south of Hadibu village, and not entirely beyond tidal influence. It was $1\frac{1}{2}$ inches in length, slender, pale red in colour, but with a prominent and very bright red clitellum. As I had then no other receptacle with me except a cyanide insect-killing bottle, I dropped the specimen into it among some Coleoptera already there. On reaching camp, I found to my chagrin that the creature had become shrivelled and contracted into an unrecognisable pellet. Although I searched afterwards most diligently, both in the plains and in the hills, I was never fortunate enough to find another specimen. Worms were manifestly extremely rare. The determination of a species from this ancient land surface would have been of special interest, considering the importance of the Oligochæta from the point of view of geographical distribution.

Botany
of
Sokotra
and
Abd-el-Kuri

PLANTÆ PHANEROGAMÆ.

Angiospermæ.

By Prof. I. B. BALFOUR, F.R.S.

PLATES XXVI A., XXVI B.

Flowering Plants.

The botanical collections brought by Dr. Forbes and Mr. Ogilvie-Grant from Sokotra and Abd-el-Kuri were of three kinds, namely :—Living plants, tubers and bulbs, seeds and dried specimens.

The Living Plants, which were brought over in Wardian cases, arrived at the Royal Botanic Garden in Edinburgh on March 23, 1899. At the request of Dr. Forbes I had furnished the expedition with a couple of Wardian cases, and it was with mixed feelings that I received, at the end of March, 1899, during a spell of hard frost, an intimation from him that the cases with plants from Sokotra were about to be despatched from London to the Royal Botanic Garden. The cases duly arrived, and thanks to the care with which Messrs. Stahl Schmidt & Co., of Great Tower Street, arranged for their transport, and to the attention which the officials of the London and North-Western Railway gave to the cases, the extreme frost of the night during which they travelled did not, I think, seriously affect the plants in the cases. The cases were unpacked on arrival at the Garden on 23rd March, and in a few days I was able to send to Dr. Forbes a report regarding the several plants they contained. The terms of this and a note of the fate of each to the date of present writing (January, 1902) is given under the respective species.

Along with the Wardian cases there arrived also a large crate containing a splendid specimen of the new fleshy Euphorbia from Abd-el-Kuri, described below, of which a figure, taken shortly after its arrival, appears in the text.

On the evening of the same day two more boxes, filled with *living succulent plants, bulbs and tubers*, reached the Garden from Dr. Forbes at Liverpool. I wish to put on record that in all my experience of shipments of specimens of a similar kind I have never seen a finer lot unpacked. Knowing as I do the conditions under which Dr. Forbes must have worked on the island, and the difficulties of collecting, husbanding, packing and transporting, the state in which his specimens arrived speaks in emphatic terms of his capacity, skill and industry in the work of exploration. Notes on the contents of these boxes are given under the species to which they belong, and I have added a note of the result of our cultivation of them. I must, however, point out that the naming of some of the bulbs is only tentative, as they have not all flowered.

The collection of *seeds* was extensive, and we have succeeded in raising a number of interesting plants. In the following pages I refer under the species to results we have obtained. Many of the seedlings cannot yet be identified with certainty, and a few years must of necessity elapse before we can say what will be the immediate benefit to horticulture from the progeny we may raise, but I hope that this will not be insignificant.

The *dried specimens* form an interesting collection. The total number of flowering plants and ferns which have been identified brought by the expedition from Sokotra is 122 species. From Abd-el-Kuri we have 53. When all the seedlings now growing have been identified there will be some additions to the list. Many species were, however, observed and identified by Dr. Forbes in the field, which it was found impossible to collect. An asterisk prefixed to the name of a species in the following list indicates that it has been so identified.

Of the Sokotran plants four are novelties, namely, *Edithcolea sordida*, N. E. Brown, belonging to a small asclepiadaceous genus established by Mr. Brown upon some Somaliland plants; *Erucum Forbesii*, a charming plant allied to *E. ceruleum*; *Holothrix socotrana*, Rolfe, an extension eastwards of an African genus of orchids; and *Aloe Forbesii*, a small species distinct from the well-known Sokotran Aloe; whilst six have not been previously recorded from the island, namely:—*Abutilon graveolens*, Wight and Arn., a tropical cosmopolitan form; *Angreecum dices*, Rolfe, an epiphytic orchid of Kilimanjaro and Mombasa; *Remusatia vivipara*, Schott, a species with an Eastern Asiatic distribution; *Scilla indica*, Baker, a plant of Hindustan and Abyssinia; *Panicum Tenerrifiv*, R. Br., a grass of the Mediterranean regions and the East, and *Pennisetum orientale*, Rich., a grass which is spread from North Africa to India.

It will be seen, then, that the new evidence brought by the expedition bearing upon the character and relationships of the Sokotran flora bears out the conclusions that have been based upon the plants previously brought from the island. The African—especially Abyssinian and Somaliland—connection is supported, the bonds with the opposite Asiatic mainland are strengthened, and most interestingly the remarkable East Indian relationship receives a further illustration.

Of the Abd-el-Kuri plants all but six were previously known to occur in Sokotra. Of these six, three are new to science, namely:—*Convolvulus Granti*, Balf. f., a distinct little species of the section which includes forms occurring in adjacent continental areas; *Salsola cycloptera*, Stapf., looking to the distribution of the genus, the occurrence of this species need not surprise us; and *Euphorbia Abdelkuri*, Balf. f., a succulent form distinct from all known ones, and, perhaps, the most remarkable botanical discovery of the expedition; the other three species are *Linaria Elatine*, Linn., a widely-spread eastern species, *Heterochloa dura*, Boiss, a Baluchistan grass, and *Sporobolus minutus*, Link, a grass of Abyssinia.

It is satisfactory that we now have some acquaintance with the nature of the vegetation of Abd-el-Kuri. I think it is probable that, when the flora of

Sokotra is investigated further, the species of *Convolvulus* and of *Salsola* now known only from Abd-el-Kuri will be found on the larger island; perhaps, too, the *Euphorbia* may be found, although of this I am less confident, because so remarkable a form would, were it on the island, assuredly be known to the people of Sokotra, and some one of the exploring expeditions should have heard of it and obtained specimens. I am inclined, therefore, to regard the *Euphorbia Abdelkuri* as likely to turn out to be an endemic species. I take it to be, like the fleshy euphorbias of Sokotra, the *Dendrosicyos*, *Dorstenia gigas*, and others, a relic of the old African flora.

It is unfortunate that, as Dr. Forbes has explained, the expedition was prevented from reaching the ground to the south-west of the Island. Of the vegetation of this area we, as yet, know nothing, and the aspect of the valleys into which one can look from the higher central plateau gives promise of much novelty. The ground over which Dr. Forbes was able to botanise was very much that which earlier expeditions had covered, and this probably accounts for the absence of more new species in his collections. Nevertheless, what he has brought home is of horticultural merit, and will also, when its results are fully secured, add to our botanical knowledge. Notwithstanding all that has been done, I am of opinion that a rich botanical harvest still awaits further exploration of Sokotra.

As it is desired to publish in this volume—containing the results of the expedition—a complete list of the names and habitats of the plants now known from Sokotra, with the names of the collectors or recorders, Dr. Forbes has extracted the necessary information from the ‘Botany of Sokotra,’ and has incorporated it here; and by the favour of the Director of Kew I am enabled to include a record of the collections made in 1897 by Mr. and Mrs. Theodore Bent.

I wish also to say that I am greatly indebted to Dr. Stapf, Mr. N. E. Brown, and Mr. R. A. Rolfe, of the Kew Herbarium, for undertaking the examination and description of plants belonging to groups to which they have given special attention.

The botanical collectors indicated in this list, and the dates of their collecting or recording are:—

Nimmo,	...	...	...	...	...	1834-39.
Wellsted,	...	...	...	...	...	1835.
Boivin,	...	...	...	...	...	1847.
Hunter,	...	...	...	...	...	1876.
Perry,	...	...	...	...	...	1876.
Collins,	...	...	...	...	...	18—.
Balfour, Cockburn, and Scott,	...	...	...	...	...	1879-80.
Schweinfurth and Riebeck,	...	...	...	...	...	1880.
Mr. and Mrs. Bent,	...	...	...	...	...	1897.
Forbes and Ogilvie-Grant,	...	...	...	...	...	1898-99.

I.—The Flowering Plants of Sokotra.

* Is prefixed to those species observed or collected as Herbarium specimens, living plants, seeds or bulbs.

† Prefixed to a species or genus indicates that it is endemic.

DICOTYLEDONES.

POLYPETALÆ.

MENISPERMACEÆ.

Cocculus, DC.

1. *Cocculus Leæba*, DC.

Hill slopes.—*B.C.S.*, *Schweinf.*

2. * † *Cocculus Balfourii*, *Schweinf.* Balfour fil., Trans. R. S. Edinb., xxxi., *Bot. of Sokotra*, Tab. I.

Observed growing abundantly in dense, wicked, and impenetrable thickets on the Haghier hills far and near round our camp at Adho Dimellus.

Found no fruit, though abundantly in flower.—*H.O.F.*

Haghier slopes (over 2000 ft.).—*B.C.S.*, *Schweinf.*, *Bent.*

PAPAVERACEÆ.

Argemone, Linn.

3. * *Argemone mexicana*, Linn.

Elbe, Hadibu Plain (3. I. 99).—*H.O.F.*

Vicinity of Hadibu.—*B.C.S.*, *Bent.*

CRUCIFERÆ.

Diceratella, Boiss.

4. † *Diceratella incana*, *Balf. fil.*, Op. cit. Tab. II.

Sandy spots of the plains about Galonsir.—*B.C.S.*

Farsetia, Desv.

5. *Farsetia longisilqua*, *Dene.*

Common on the limestone plains.—*B.C.S.*, *Schweinf.*

6. *Farsetia prostrata*, *Balf. fil.*

On plains about Galonsir.—*B.C.S.*

7. † *Farsetia* sp.

Near Galonsir.—*B.C.S.*

Sisymbrium, *Linn.***8. *Sisymbrium erysimoides***, *Desf.*

An occasional weed.—*B.C.S.*, *Schweinf.*

Brassica, *Linn.***9. *Brassica rostrata***, *Balf. fil.*

Abundant on the hill slopes up to a great elevation ; on sheltered spots under cliffs or boulders.—*B.C.S.*

10. † *Brassica rostrata*, *Balf. fil.* var. ***hirsuta***, *Balf. fil.*—*B.C.S.***Lachnocapsa**, *Balf. fil.***11. † *Lachnocapsa spathulata***, *Balf. fil.*, *Op. cit.* Tab. III.

Sandy places near Galonsir.—*B.C.S.*

CAPPARIDEÆ.**Cleome**, *Linn.***12. *Cleome papillosa***, *Steud.*

Near Hadibu.—*Schweinf.*

13. † * *Cleome socotrana*, *Balf. fil.*

On Garieh Plain.—*H.O.F.*

Not uncommon.—*B.C.S.*, *Schweinf.*

14. *Cleome tenella*, *Linn. fil.*

On plains about Galonsir and Hadibu.—*B.C.S.*, *Schweinf.*

15. *Cleome brachycarpa*, *Fahl.*

Sandy parts of the limestone plains.—*B.C.S.*, *Schweinf.*, *Bent.*

16. *Cleome brachycarpa*, *Fahl.* var. ***filicaulis***, *Schweinf.*

Near Hadibu.—*Schweinf.*, *Bent.*

17. *Cleome viscosa*, *Linn.*

About villages.—*B.C.S.*, *Schweinf.*, *Bent.*

Gynandropsis, *DC.***18. *Gynandropsis pentaphylla***, *DC.*

About habitations.—*B.C.S.*, *Schweinf.*

Mærua, *Forsk.***19. * *Mærua angolensis***, *DC.*

Seen growing in the crevices of the limestone rocks on the slopes of Geb-el-Raggit above Hadibu village.—*H.O.F.*

On hills and plains ; Keregnigiti ; near Hadibu Plain ; at Galonsir.—*B.C.S.*, *Schweinf.*, *Bent.* *Wellsted.*

Cadaba, Forsk.**20. Cadaba rotundifolia, Forsk.**

Hill slopes near Galonsir.—*B.C.S.*

21. Cadaba longifolia, DC.

Not common on the plains.—*B.C.S.*

Capparis, Linn.**22. Capparis aphylla, Roth.**

Dry limestone plains at the east and west ends of the island.—*B.C.S.*

23. Capparis spinosa, Linn.

On the plains, common.—*B.C.S., Schweinf.*

RESEDACEÆ.**Caylusea, St. Hil.****24. Caylusea canescens, St. Hil.**

Bent.

Reseda, Linn.**25. † * Reseda viridis, Balf. fil.**

Observed on hills above Homhil; and on Hadibu Plain.—*H.O.F.*

Seed collected on slopes of hills near Galonsir at 1500 ft. The plants raised from this have flowered freely in the Royal Botanic Garden.—*B.C.S., Bent.*

Ochradenus, Del.**26. Ochradenus baccatus, Del.**

Limestone plains at east and west ends of the island.—*B.C.S., Schweinf.*

VIOLARIEÆ.**Viola, Linn.****27. † * Viola cinerea, Boiss.**

Homhil (22. l. 99); observed and seed collected.—*H.O.F.*

Near Galonsir.—*B.C.S.*

Ionidium, Vent.**28. Ionidium suffruticosum, Ging.**

Common.—*B.C.S., Schweinf.*

Alsodeia, Thouars.**29. † Alsodeia socotrana, Balf. fil.**

Near Hadibu.—*B.C.S.*

BIXINEÆ.**Aberia, Hochst.****30. Aberia abyssinica, Cos.**

Common.—*B.C.S., Schweinf.*

POLYGALEÆ.**Polygala, Linn.****31. Polygala abyssinica, Fres.**

Common.—*B.C.S.*

32. Polygala erioptera, DC.

On the plains.—*B.C.S., Schweinf.*

33. Polygala chinensis, Linn.

On limestone hills, sparingly.—*B.C.S.*

CARYOPHYLLEÆ.**Gypsophila, Linn.****34. Gypsophila montana, Balf. fil.**

Haghier Hills (over 2500 ft.).—*B.C.S.*

35. Gypsophila montana, var. viscida, Balf. fil.

Rarer than the Type.—*B.C.S., Schweinf.*

Silene, Linn.**36. * Silene apetala, Willd.**

Homhil (No. 167).—*H.O.F.*

Common on hills at all elevations.—*B.C.S., Schweinf.*

Arenaria, Linn.**37. Arenaria serpyllifolia, Linn.**

Abundant in many places.—*B.C.S.*

Polycarpæa, Lamk.**38. Polycarpæa corymbosa, Lamk.**

Plain near Khadup.—*B.C.S.*

39. * Polycarpæa spicata, Arn.

Slopes of Aduna (600 ft., 21. XII. 98, No. 128).—*H.O.F.*

Haghier Hills near Hadibu.—*B.C.S.*

40. † Polycarpæa spicata, Arn., var. capillaris, Balf. fil.

Near Galonsir, and elsewhere.—*B.C.S., Schweinf.*

41. † * Polycarpæa divaricata, Balf. fil.

Several localities, often at considerable elevations.—*H.O.F., B.C.S., Schweinf.*

42. * **Polycarpæa, cæspitosa**, *Balf. fil.*Homhil (1200 ft., l. 99, No. 186).—*H.O.F.*Plains beyond Hadibu, and elsewhere.—*B.C.S.***PORTULACEÆ.****Portulaca**, *Linn.*43. * **Portulaca oleracea**, *Linn.*Abundant.—*B.C.S.*, *H.O.F.*44. **Portulaca quadrifida**, *Linn.*Abundant.—*Hunt.*, *B.C.S.*, *Schweinf.***Talinum**, *Adans.*45. * **Talinum cuneifolium**, *Willd.*Dahamis, seeds collected (20. XII. 98); Homhil (1000 ft., l. 99).—*H.O.F.*Near Hadibu and Galonsir.—*B.C.S.*, *Schweinf.*46. **Talinum crassifolium**, *Willd.**Bent.***TAMARISCINÆ.****Tamarix**, *Linn.*47. * **Tamarix gallica**, *Linn.*Near Khor Garieh.—*H.O.F.*Shore at Garieh.—*B.C.S.*, *Schweinf.***HYPERICINÆ.****Hypericum**, *Linn.*48. **Hypericum** (*Androsæmum*) **mysorense**, *Heyne.*Especially abundant round our camp at Adho Dimellus (No. 273).—*H.O.F.*

Two plants brought over in a Wardian case unfortunately died, but we have raised a number of plants from seeds brought home by the expedition. The shoots and foliage are elegant in themselves, but the large flowers which belong to the species, and which will, I hope, be produced ere long on our plants, make this plant a most welcome addition to our stock of flowering plants for green-house cultivation.

Rocky places at an elevation of over 1500 ft.—*Bent*, *Nimmo*, *B.C.S.*, *Schweinf.*

49. * **Hypericum** (*Androsæmum*) **lanceolatum**, *Lamk.*Adho Dimellus.—*H.O.F.*On the higher rocky parts of the hills.—*B.C.S.*50. † * **Hypericum** (*Arthrophylla*) **scopulorum**, *Balf. fil.*, Op. cit. Tab. IV, A.

Seeds of this have given us several nice seedling plants, which, as small woody shrubs with a profusion of small yellow flowers, will not be

without attraction in our green-houses. Of eight plants brought home in a Wardian case alive, in various stages, all unfortunately died.

Not uncommon amongst the boulders on the Sokotran hills at altitudes over 1000 ft.—*B.C.S.*, *Schweinf.*

Adho Dimellus (4000 ft., 2. II. 99).—*H.O.F.*

51. † * **Hypericum** (*Arthrophylla*) **tortuosum**, *Balf. fil.*, Op. cit. Tab. IV, B.

Adho Dimellus (4000 ft.).—*H.O.F.*

With the foregoing species on the Haghier range at a high elevation.—*B.C.S.*, *Schweinf.*, *Bent.*

MALVACEÆ.

Malva, *Linn.*

52. **Malva parviflora**, *Linn.*

On the limestone plains near villages.—*B.C.S.*

Sida, *Linn.*

53. **Sida cordifolia**, *Linn.*

In the valley Kischen.—*Schweinf.*

54. **Sida rhombifolia**, *Linn.*

Common.—*B.C.S.*, *Schweinf.*

55. * **Sida humilis**, *Willd.*

Adma slopes (21. XII. 98, No. 123).—*H.O.F.*

By the Wadi Digal.—*Schweinf.*

56. **Sida grewioides**, *Guill. et Perr.*

Common on the limestone plains.—*B.C.S.*

Abutilon, *Gærtn.*

57. **Abutilon fruticosum**, *Guill. et Perr.*

Common.—*B.C.S.*, *Schweinf.*

58. **Abutilon muticum**, *G. Don.*

Sparingly on the hills.—*B.C.S.*

59. * **Abutilon graveolens**.

Hadibu Plain (No. 100).—*H.O.F.*

A very hairy form of this species, which is an addition to the plants previously known from Sokotra.

Pavonia, *Cav.*

60. **Pavonia odorata**, *Willd.*

Bent.

Senra, *Cav.*

61. **Senra incana**, *Cav.*

Common round Galousir and other villages.—*B.C.S.*, *Schweinf.*

Hibiscus, *Linn.*

62. **Hibiscus** (Bombicella) **intermedius**, *Ach.*

On plains about Galonsir and Hadibu.—*B.C.S., Schweinf.*

63. **Hibiscus** (Bombicella) **micranthus**, *Linn. fil.*

Not uncommon.—*B.C.S., Schweinf.*

64. **Hibiscus** (Lagumæa) **Solandra**, *L'Hér.*

Near Hadibu and Galonsir.—*B.C.S., Bent.*

65. **Hibiscus** (Lagumæa) **ternatus**, *Must.*

Plains about Hadibu.—*B.C.S., Schweinf.*

66. * **Hibiscus** (Ketmia) **vitifolius**, *Linn.*

(No. 174.)—*H.O.F.*

Common.—*B.C.S., Schweinf.*

67. † * **Hibiscus** (Ketmia) **Scotti**, *Balf. fil.*, *Op. cit.* Tab. V, A.

Above camp at Homhil (2000 ft.) ; at Adho Dimellus (4000 ft.). (Nos. 206, 215.)—*H.O.F.*

On the hill slopes at considerable elevation.—*B.C.S., Schweinf.*

Several plants have come up from seeds of this species, and its large brilliant yellow flowers should give it a distinct place in horticulture.

Unfortunately, its hairs are stiff and easily detached, and therefore apt to cause some irritation in the skin of any one handling the plant, and this may militate against its success as a horticultural acquisition.

68. † * **Hibiscus** (Ketmia) **stenanthus**, *Balf. fil.*

Matagoti, above camp at Homhil (1500 ft., 19. I. 99).—*H.O.F.*

On limestone plateaux (over 1000 ft.).—*B.C.S., Hunter.*

69. † **Hibiscus** (Ketmia) **malocophyllus**, *Balf. fil.*

Near Adho Dimellus ; not abundant.—*B.C.S., Schweinf., Bent.*

70. **Hibiscus**, *sp.*

Abundant on hill slopes.—*B.C.S.*

Gossypium, *Linn.*

71. * **Gossypium** **barbadense**, *Linn.*

Below Jena-agahan ; on the Garieh Plain ; cultivated (No. 147).—*H.O.F.*

Near habitations.—*B.C.S.*

STERCULIACEÆ.**Sterculia**, *Linn.*

72. * **Sterculia** **Triphaca**, *R. Br.*

Homhil (2000 ft., 19. I. 99). In Dinchau Valley leading from Hadibu Plain to Adho Dimellus.—*H.O.F.*

Common on the hills.—*B.C.S., Schweinf.*

Melhania, Forsk.

73. † **Melhania muricata**, *Balf. fil.*, Op. cit. Tab. VI, A.
Near Galonsir ; not uncommon.—*B.C.S.*, *Bent.*

TILIACEÆ.**Grewia, Linn.**

74. **Grewia populifolia**, *Vahl.*
Not common.—*B.C.S.*, *Schweinf.*
75. **Grewia orbiculata**, *Rottl.*
Hill slopes.—*B.C.S.*
76. **Grewia salvifolia**, *Heyne.*
Hill slopes ; not frequent.—*B.C.S.*
77. † * **Grewia turbinata**, *Balf. fil.*
Observed on slopes of Haghier above Hadibu.—*H.O.F.*
Amongst boulders by the side of Keregnigita. — *B.C.S.*, *Schweinf.*
78. † **Grewia bilocularis**, *Balf. fil.*
Near Aduma (over 3000 ft.).—*B.C.S.*

Corchorus, Linn.

79. **Corchorus acutangulus**, *Lamk.*
On plains ; not uncommon.—*B.C.S.*, *Schweinf.*
80. **Corchorus Antichorus**, *Rauschel.*
On dry plains ; common.—*B.C.S.*, *Schweinf.*
81. † * **Corchorus erodioides**, *Balf. fil.*, Op. cit. Tab. VII, B.
Hadibu Plain (XII. 98, No. 106). Observed also on Garieh Plain ; and on Kamahanu slope and elsewhere.—*H.O.F.*
On sandy plains near Galonsir and Hadibu.—*B.C.S.*, *Schweinf.*, *Bent.*, *Boivin.*

Elæocarpus, Linn.

82. † **Elæocarpus transultus**, *Balf. fil.*
Hills about Galonsir and Hadibu.—*B.C.S.*

LINEÆ.**Linum, Linn.**

83. **Linum gallicum**, *Linn.*
Hill slopes (over 1000 ft.).—*B.C.S.*

MALPIGHIACEÆ.**Acridocarpus**, *Guill. et Perr.***84. * Acridocarpus orientalis**, *Ad. Juss.*

In the valley of the Dinehan *en route* to Adbo Dimellus, in seed and flower (2. II. 99) ; Aduna Slopes (400-1500 ft., 21. XII. 98, No. 128).

—*H.O.F.*

On Haghier Hills ; abundant. — *B.C.S., Schweinf., Bent, Nimmo.*

ZYGOPHYLLLEÆ.**Tribulus**, *Linn.***85. Tribulus terrestris**, *Linn.*

On plains ; common. — *B.C.S., Schweinf., Bent.*

Zygophyllum, *Linn.***86. Zygophyllum simplex**, *Linn.*

On plains ; common. — *B.C.S., Bent.*

87. * Zygophyllum album, *Linn.*

Collected, but with locality lost. — *H.O.F.*

Sandy spots near the shore at Galonsir and elsewhere. — *B.C.S.*

Fagonia, *Linn.***88. Fagonia cretica**, *Linn.* var. **arabica**, *T. Anders.*

On plains ; common. — *B.C.S., Nimmo.*

89. † * Fagonia cretica, *Linn.* var. **socotrana**, *Balf. fil.*

On Hadibu Plain, at Elbe ; and on Garieh Plain, near Kamaham camp. — *H.O.F.*

Abundant. — *B.C.S.*

GERANIACEÆ.**Geranium**, *Linn.***90. * Geranium mascatense**, *Boiss.*

Homhil (No. 166, 172). On Matagoti, above Homhil camp (about 1900-2000 ft.). At 4000 ft. this beautiful Geranium had a more erect than procumbent habit. — *H.O.F.*

Seeds of this have germinated ; but the plant is not of horticultural interest. — *B.C.S., Bent.*

Dirachma, *Schweinf.***91. † Dirachma socotrana**, *Schweinf.* Balfour fil., Op. cit. Tab. VIII.

On slopes of Haghier ; not uncommon. — *B.C.S., Schweinf.*

Oxalis, Linn.**92. * *Oxalis corniculata*, Linn.**

Slopes of Aduna (400 ft., 2. XII. 98, No. 129).—*H.O.F.*

Common.—*B.C.S.*

RUTACEÆ.**Ruta, Linn.****93. *Ruta graveolens*, Linn. var. *angustifolia*, Hook. fil.**

Near Hadibu.—*B.C.S.*

Thamnosma, Torr. et Frem.**94. † * *Thamnosma socotrana*, Balf. fil.**

Two plants were brought over in a Wardian case, but, being far gone on arrival, unfortunately died.

On Haghier hills (over 1500 ft.).—*B.C.S.*, *Schweinf.*, *Bent.*

Collected on Haghier range above Adho Dimellus (4200 ft.).—*H.O.F.*

Citrus, Linn.**95. * *Citrus aurantium*, Willd.**

Observed on the Tabāsheh plateau, above the Dinehan Valley, near Adho Dimellus camp (4000 ft.). Probably introduced from Portugal and deteriorated, as the fruit is quite as bitter as aloes.—*H.O.F.*

On hills at Adho Dimellus, and also near Feregeh.—*B.C.S.*

BURSERACEÆ.**Boswellia, Roxb.****96. † * *Boswellia Ameero*, Balf. fil., Op. cit. Tab. IX.**

Dinehan Valley. Native name "Ameiro" (No. 200).—*H.O.F.*

On slopes of the Haghier Hills about Hadibu; also about Homhil.—*B.C.S.*, *Schweinf.*, *Hunter*, *Bent*, *Wellsted*.



YOUNG SEEDLING OF BOSWELLIA AMEERO.

Two plants of this species or of *B. elongata*, brought over in a Wardian case, are growing well (December, 1900). The accompanying figure shows a young seedling which we have raised. It is interesting to note that its cotyledons are quite those of a *Tilia*. I am not able to determine with certainty to what species the plants belong. Dr. Forbes, however, assures me the species is *B. Ameero*, collected below Adho Dimellus in the Dinehan Valley (3800 ft.), January 18, 1899, the trees then coming into flower; the fruits gathered were those of the previous year, which had not fallen from their capsules.

Mr. E. M. Holmes, of the Pharmaceutical Society's Museum in London, sends the following note to Dr. Forbes on a specimen of gum collected on the 23rd January, 1898, and sent to him for examination.

"The sticky oleo-gum resin mixed with bark received from Dr. Forbes under the name of Ameero is evidently a variety of frankincense derived from *Boswellia Ameero*, Balf. f., an account of which is published by Professor I. B. Balfour in the *Botany of Sokotra*, p. 49; cf. also Introduction, p. xxxviii., and Appendix, p. 441-442, where an analysis by Dr. Dobbie is given. Even when dried in the form of small tears, in which form it was presented to the Museum of the Pharmaceutical Society some years ago by Professor Balfour, it would not find a market in this country, since frankincense from Arabia and Somaliland can be obtained of much better quality at a cheaper rate (10d. per lb. wholesale)."

97. † * ***Boswellia elongata***, *Balf. fil.*, Op. cit. Tab. X.

Seen at Hombil at 1500 ft.

On the hill slopes.—*B.C.S.*, *Bent*.

98. ***Boswellia* sp.**

On the hills south-west of Galonsir.—*B.C.S.*

99. † * ***Boswellia socotrana***, *Balf. fil.*, Op. cit. Tab. XI.

Seen at Hombil, and in the Dinehan valley on our way from Hadibu Plain to Adho Dimellus; but not in flower. (Pl. 99.)

On the Haghier hills: not uncommon.—*B.C.S.*, *Schweinf.*

100. ***Boswellia* sp.**

On the limestone plains.—*B.C.S.*

Balsamodendron, Kunth.

101. ***Balsamodendron Mukul***, *Hook.*

On the Khadup Plain.—*B.C.S.*

102. † * ***Balsamodendron socotranum***, *Balf. fil.*, Op. cit. Tab. XII.

Observed abundantly at Hombil, and in the valleys both north and south of the Adho Dimellus water-parting. Called by the natives "Lagahan" and "Semahānu." Some of the gum-resin, "Luban"

(Sokotri), collected from a tree here was sent to Mr. Holmes, who sends the following note :

“The Lagalan sent me by Dr. Forbes is certainly not the oleo-gum-resin of a *Balsamodendron* but that of a *Boswellia*, possibly *Boswellia socotrana*, Balf. f. There is probably some mistake about the name. It is not so fragrant as ordinary frankincense of Somaliland and Arabia, and could not possibly compete with it in English commerce.”

[In face of the above statement, I hardly like to assert that I feel confident I collected the gum from a *Balsamodendron*, I believe, *B. socotranum*, and boxed it on the spot.—H.O.F.]

Abundant.—B.C.S., *Schweinf.*

103. † **Balsamodendron parvifolium**, *Balf. fil.*

On the plains.—B.C.S.

104. † * **Balsamodendron planifrons**, *Schweinf.* Balfour fil., Op. cit. Tab. XIII.

Seen in the Dinchan valley leading from Hadibu to Adho Dimellus, and in the valleys leading south from our camp at that place.—H.O.F.

Near Hadibu, and above Kischen at 2400 ft.—B.C.S., *Schweinf.*, *Bent, Hunter.*

105. **Balsamodendron sp ?**

B.C.S., *Bent.*

106. **Balsamodendron sp ?**

B.C.S., *Bent.*

RHAMNEÆ.

Zizyphus, *Juss.*

107. * **Zizyphus jujuba**, *Lamk.*

(No.).—H.O.F.

Plants have been raised from seeds brought by the expedition.

Common.—B.C.S.

108. * **Zizyphus spina-christi**, *Willd.*

The fruit is largely eaten by the natives ; numerous birds also feed on it—the *Amygdri* and the Cuckoo ; and the leaves are eagerly devoured by camels. Seen everywhere up to 2000 ft.—H.O.F.

Common.—B.C.S., *Wellsted.*

AMPELIDEÆ.

Vitis, *Linn.*

109. **Vitis quadrangularis**, *Wall.*

On plateau S.W. from Galonsir (over 1500 ft.).—B.C.S.

110. † * **Vitis subaphylla**, *Balf. fil.*

(Nos. 26a, 40, 41, 81c, 150a.) Kamabamu (28. XII. 98). Fadchen (3. I. 95).—*H.O.F.*

Very common on plain near Galonsir.—*B.C.S., Schweinf.*



SEEDLING OF VITIS SUBAPHYLLA.

We have raised several seedlings of this plant. The hypocotyl rises about a couple of inches above ground bearing a pair of slightly palmately lobed cotyledons. The radial orthotropous axis of the hypocotyl is terete at the base and gradually becomes quadrangular with nearly equal sides. Upon the top of the hypocotyl at the base of each cotyledon is a pair of cushion-glands, one on each side of its petiole. The plumular shoot forms a long internode with one leaf at its apex at right angles to the median of the cotyledons, and this leaf has a pair of cushion-glands at its base. Succeeding similar internodes are developed, and the leaves are distichous. It is interesting to note, however, that the first internode of the plumular axis is not like the hypocotyl quadrangular with equal sides. It is distinctly compressed, and has two broad surfaces and two narrow edges. Of the broad surface, that upon the side upon which the leaf springs is concave, the opposite side is convex, the narrower edges are flat. In the second

internode the same type of flattened axis is developed, but the direction of the concave and convex sides is reversed, and the edges are commonly reduced so as to be mere sharp margins without any surface. In this plumular axis, then, we have the interesting feature of the development of a dorsiventral axis as an orthotropous shoot on the top of a radial orthotropous hypocotyl, the change being brought about by the flattening of the internodes in one direction.

These points will be readily understood from the accompanying figure.

111. † **Vitis paniculata**, *Balf. fil.*

Common, climbing among small trees on the hill slopes.—*B.C.S.*, *Schweinf.*

SAPINDACEÆ.

Allophylus, *Linn.*

112. * **Allophylus** (*Schmidelia*) **rhoidiphyllus**, *Balf. fil.*

Observed at Homhil (19. 1. 99). Gathered seeds on Matagoti in the clefts of the rock above the camp (2500 ft.), which had apparently been passed by birds, probably *Amydri*, in large quantities. Aduna slopes (400-1500 ft., 21. XII. 98, No. III).—*H.O.F.*

We have some seedlings which probably are this plant.

Very common.—*B.C.S.*, *Schweinf.*

113. **Allophylus**, *sp. ?*

Hill slopes near Hadibu.—*B.C.S.*

Dodonæa, *Linn.*

114. * **Dodonæa viscosa**, *Linn.*

Adho Dimellus (3500 ft., 1. 99, No. 47).—*H.O.F.*

Seeds of this common plant have germinated.

Haghier hills.—*B.C.S.*

ANACARDIACEÆ.

Rhus, *Linn.*

115. **Rhus glaucescens**, *Ach. Rich.*

Hill slopes.—*B.C.S.*

116. † * **Rhus thyrsiflora**, *Balf. fil.*

Aduna slopes (400-1500 ft., 21. XII. 98, Nos. 114-131). Adho Dimellus, (4000 ft., No. 208).—*H.O.F.*

Common on hill slopes and in the valleys.—*B.C.S.*, *Schweinf.*, *Bent*, *Nimmo*.

Odina, *Roxb.*

117. † * **Odina ornifolia**, *Balf. fil.*

Jena-agahan (1500-2000 ft., 3. 1. 99, No. 154).—*H.O.F.*

A not uncommon tree.—*B.S.C.*, *Schweinf.*, *Wellsted*.

118. † * **Odina asplenifolia**, *Balf. fil.*

Aduna (21. XII. 98., 400-1800 ft., No. 139).—*H.O.F.*

One plant which apparently belonged to this species was brought home in a Wardian case, but it hardly survived its arrival.

On hill slopes, often at high elevation.—*B.R.C., Bent.*

LEGUMINOSÆ.**Crotalaria**, *Linn.*119. **Crotalaria spinosa**, *Hochst.*

Sandy plains.—*B.R.C., Schreinf.*

120. **Crotalaria retusa**, *Linn.*

Plains near Galonsir.—*B.C.S., Schreinf., Bent.*

121. † * **Crotalaria strigulosa**, *Balf. fil.*

Aduna slopes (21. XII. 98, No. 132).—*H.O.F.*

Common on sandy plains.—*B.R.C., Schreinf.*

122. * **Crotalaria leptocarpa**, *Balf. fil.*, Op. cit. Tab. XIV, A.

Common on the plains.—*B.S.C., Schreinf.*

123. † **Crotalaria pteropoda**, *Balf. fil.*, Op. cit. Tab. XIV, B.

Hills south-west of Galonsir.—*B.C.S.*

Priotropis, *Wight & Arn.*124. † * **Priotropis socotrana**, *Balf. fil.*

In the Dinehan valley leading to Adho Dimellus (2000 ft., l. II. 99, Nos. 201-232).—*H.O.F.*

Higher levels of the Haghier hills.—*B.C.S., Schreinf.*

Trigonella, *Linn.*125. † **Trigonella falcata**, *Balf. fil.*

Sandy places.—*B.C.S.*

Medicago, *Linn.*126. **Medicago denticulata**, *Willd.*

On the plains; common.—*B.C.S.*

127. **Medicago minima**, *Lamk.*

Common.—*B.C.S.*

128. **Medicago laciniata**, *All.*

Sandy plains.—*B.C.S.*

Melilotus, *Juss.***129. *Melilotus parviflora***, *Desf.*

Common.—*B.C.S.*

Lotus, *Linn.***130. *Lotus* (*Ononidium*) *arabicus***, *Linn.* var. ***trigonelloides***, *Webb et Bethr.*

Sandy plains.—*B.C.S.*

131. † * *Lotus* (*Ononidium*) *ononopsis*, *Balf. fil.*, *Op. cit.* Tab. XVI.

Observed in flower on limestone summit of Matagoti (2500 ft.). Jena-
agahan, on granite (1500-2000 ft., 3. l. 99, No. 149).—*H.O.F.*

Hills, at high elevation ; abundant.—*B.C.S.*, *Schweinf.*, *Bent.*

132. † * *Lotus* (*Ononidium*) *mollis*, *Balf. fil.*, *Op. cit.* Tab. XVII, A.

Observed in flower on limestone summit of Matagoti (2500 ft., l. 99).—
H.O.F.

On limestone cliffs south-west from Galonsir.—*B.C.S.*

Psoralea, *Linn.***133. *Psoralea corylifolia***, *Linn.*

About dwellings.—*B.C.S.*

Indigofera, *Linn.***134. † * *Indigofera nephrocarpa***, *Balf. fil.*, *Op. cit.* Tab. XVIII, A.

On the summit of Hamaderu, above Hombil camp, at 2700 ft. (No. 162.)

Observed also on Hadibu Plain.—*H.O.F.*

Common plant of the plains.—*B.C.S.*, *Schweinf.*

135. *Indigofera cordifolia*, *Roth.*

Common.—*B.C.S.*, *Schweinf.*

136. *Indigofera paucifolia*, *Delile.*

Galonsir and elsewhere.—*B.C.S.*

137. * *Indigofera intricata*, *Boiss.*

Observed on Hadibu Plain.—*H.O.F.*

Very abundant in the plains, especially on Hadibu Plain.—*B.C.S.*,
Schweinf.

138. *Indigofera leptocarpa*, *Hochst. et Steud.*

On limestone plains ; not common.—*B.C.S.*, *Schweinf.*

139. *Indigofera viscosa*, *Lamk.*

Common on limestone plains.—*B.C.S.*, *Schweinf.*

140. † *Indigofera marmorata*, *Balf. fil.*, *Op. cit.* Tab. XVIII, B.

Hill slopes (over 1000 ft.).—*B.C.S.*, *Schweinf.*

141. * Indigofera Gerardiana, Griseb.

Adho Dimellus. (Nos. 207-221.)—*H.O.F.*

Higher regions of hills (over 2000 ft.): abundant on Haghier, south of Hadibu.—*B.C.S., Schweinf., Bent.*

142. * Indigofera tinctoria, Linn.

Observed everywhere.—*B.C.S., Schweinf., Bent.*

Used by the natives to dye cloth.—*H.O.F.*

143. * Indigofera argentea, Linn.

Observed near Hadibu.—*H.O.F.*

Common about Galonsir and Hadibu.—*B.C.S.*

Tephrosia, Pers.**144. † * Tephrosia (Brissonia) odorata, Balf. fil.**

Homhil (1700 ft., Nos. 178-179.)—*H.O.F.*

On the cliffs south-west from Galonsir (over 1500 ft.).—*B.C.S.*

145. Tephrosia (Reinera) subtriflora, Hochst.

On the plains.—*B.C.S.*

146. Tephrosia (Reinera) anthylloides, Hochst.

On the plains.—*B.C.S.*

147. * Tephrosia (Reinera) vicioides, Ach. Rich.

On the plains.—*B.C.S., Schweinf.*

148. Tephrosia (Reinera) purpurea, Pers.

On the plains.—*B.C.S.*

149. Tephrosia (Reinera) Apollinea, DC.

On the plains.—*B.C.S., Hunter.*

Taverniera, DC.**150. † Taverniera sericophylla, Balf. fil., Op. cit. Tab. XIX.**

Sandy spots near sea at Galonsir, and on Khadup Plain.—*B.C.S.*

Ormocarpum, Beauv.**151. † Ormocarpum cæruleum, Balf. fil., Op. cit. Tab. XX.**

Plains and hill slopes at low altitudes.—*B.C.S., Schweinf., Bent.*

Arthrocarpum, Balf. fil.**152. † Arthrocarpum gracile, Balf. fil., Op. cit. Tab. XXI.**

Hills near Hadibu and elsewhere.—*B.C.S., Schweinf.*

Zornia, *Gmel.***153. Zornia diphylla**, *Pers.*

Haghier hills near Hadibu Plain. — *B.C.S.*

Desmodium, *Desv.***154. Desmodium triflorum**, *DC.*

Not uncommon. — *B.C.S.*

Alysicarpus, *Neck.***155. * Alysicarpus vaginalis**, *DC.*

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 137.) — *H.O.F.*
Occasional weed. — *B.C.S., Schweinf.*

Teramnus, *Swartz.***156. * Teramnus labialis**, *Spreng.* var. **mollis**, *Baker.*

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 124.) — *H.O.F.*
Hadibu and Galonsir. — *B.C.S., Schweinf.*

Erythrina, *Linn.***157. Erythrina**, *sp.*

Hills south of Hadibu. — *B.C.S.*

Canavalia, *Adans.***158. Canavalia ensiformis**, *DC.*

Hill slopes. — *B.C.S.*

Vigna, *Savi.***159. * Vigna luteola**, *Benth.*

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 136.) — *H.O.F.*
Common. — *B.C.S., Schweinf., Benth.*

Cylista, *Ait.***160. * Cylista scariosa**, *Ait.*

Homhil (No. 199.) — *H.O.F.*

Rhynchosia, *Lour.***161. Rhynchosia minima**, *DC.*

Common. — *B.C.S., Schweinf.*

162. Rhynchosia Memnonia, *DC.*

Hill slopes. — *B.C.S., Schweinf.*

Cassia, *Linn.*163. * **Cassia Sophora**, *Linn.*

Observed abundantly. — *H.O.F.*

Common about villages on the plain. — *B.C.S., Schweinf., Bent.*

164. **Cassia Tora**, *Linn.*

Near villages. — *B.C.S., Bent.*

165. **Cassia obovata**, *Collad.*

Near Hadibu. — *Schweinf.*

166. **Cassia holosericea**, *Fresen.*

On plains near villages. — *B.C.S., Schweinf.*

167. **Cassia Absus**, *Linn.*

Near habitations. — *B.C.S.*

Tamarindus, *Linn.*168. * **Tamarindus indica**, *Linn.*

Observed on the slopes of Aduna and elsewhere. — *H.O.F.*

A few trees. — *B.C.S.*

Entada, *Adans.*169. † **Entada**, *sp.*

Slopes of Haghier. — *B.C.S.*

Dichrostachys, *DC.*170. † **Dichrostachys dehiscens**, *Balf. fil.*, *Op. cit. Tab. XXII.*

Khadup and Hadibu Plains. — *B.C.S., Schweinf.*

Acacia, *Willd.*171. † * **Acacia socotrana**, *Balf. fil.*, *Op. cit. Tab. XXIII.*

Observed on Hadibu Plains. — *H.O.F.*

On the plains near sea on north side of island, especially in vicinity of Delishi. — *B.C.S., Schweinf.*

172. † * **Acacia pennivenia**, *Schweinf.* — *Balfour fil., Op. cit. Tab. XXIV.*

Observed on slopes of Aduna. — *H.O.F.*

Hill slopes of Haghier. — *B.C.S., Schweinf., Hunter.*

173. † **Acacia**, *sp.*

Plains near Galonsir. — *B.C.S.*

CRASSULACEÆ.**Tillæa**, *Linn.*174. **Tillæa pentandra**, *Royle.*

Common on hills. — *B.C.S., Schweinf.*

Kalanchoe, Adans.**175. * *Kalanchoe rotundifolia*, Haw.**

Three plants of this species, brought home in a Wardian case, are now growing. Seedlings have also been raised from seed.

Collected on the limestone hills around Hombil : also on granite hills above Adho Dimellus (about 3000-4300 ft., 2. II. 99).—*H.O.F.*

On higher parts of Haghier. — *B.C.S., Schweinf., Bent.*

176. † * *Kalanchoe farinacea*, Balf. fil., Bot. Mag. tab. 7769.

On limestone hills above Hombil (1800-2000 ft., No. 186, bis). Also gathered on Gebel Bitzobur.—*H.O.F.*

Common on limestone plains of the higher parts of island.—*B.C.S., Schweinf., Hunter.*

Twelve plants of this species, brought in a Wardian case, are now growing.

177. † * *Kalanchoe robusta*, Balf. fil.

Hombil.—*H.O.F.*

On plains at the east end of the island only.—*B.C.S.*

Three plants of this species, brought in a Wardian case, are now growing.

178. † * *Kalanchoe abrupta*, Balf. fil.

Only on plains towards the eastern end of island.—*B.C.S.*

LYTHRARIÆ.***Ammannia*, Linn.****179. *Ammannia baccifera*, Linn.**

Galonsir : Hadibu, and elsewhere.—*B.C.S., Schweinf.*

180. *Ammannia multiflora*, Rorb.

Near Galonsir.—*B.C.S.*

Lythrum*, Linn.*181. *Lythrum hyssopifolium*, Linn.**

On the plains.

Punica*, Linn.*182. † * *Punica protopunica*, Balf. fil., Op. cit. Tab. XXV.**

Observed in the valleys running south from the Adho Dimellus pass (3900 ft.) : also on the Aduma slopes at about same elevation, and at Jena-agaban, on an eastward facing slope of the Haghier range.—*H.O.F.*

Higher parts of Haghier range.—*B.C.S., Schweinf., Bent, Hunter.*

We have raised a couple of young plants from seeds of this species brought by the expedition.

ONAGRARIÆ.

Ludwigia, Linn.

183. **Ludwigia palustris, Ell.**

Common.—*B.C.S., Schweinf.*

CUCURBITACEÆ.

Eureiandra, Hook. fil.

184. † **Eureiandra Balfourii, Cogniaux.** Balfour fil., Op. cit. Tab. XVII, B.

Spread over the island.—*B.C.S., Schweinf.*

Momordica.

185. * **Momordica Balsamina, Linn.**

Observed in Hadibu Plain.—*H.O.F.*

Near Hadibu.—*B.C.S.*

186. **Momordica Charantia, Linn.,** var. **abbreviata, Ser.**

Near Galonsir.—*B.C.S.*

Cucumis, Linn.

187. **Cucumis ficifolius, Ach. Rich.,** var. **echinophorus, Naud.**

Not uncommon.—*B.C.S., Schweinf., Bent.*

188. * **Cucumis prophetarum, Linn.**

Observed several places.—*H.O.F.*

Not uncommon.—*B.C.S.*

189. **Cucumis dipsaceus, Ehrenb.**

Hadibu.—*Schweinf.*

Citrullus, Schrad.

190. * **Citrullus Colocynthis, Schrad.**

Fruits collected on Gebel Fadehen (3. I. 99).—*H.O.F.*

Occasional about villages.—*B.C.S., Boirin.*

Melothria, Linn.

191. **Melothria punctata ?, Cogn.**

Near Hadibu.—*B.C.S.*

Dendrosicyos, Balf. fil.

192. † * **Dendrosicyos socotrana**, *Balf. fil.*, Op. cit. Tab. XXVI.

Abundant. Only once found, however, in fruit or flower, near the top of the Goahal Valley, on our way to Homhil. — *H.O.F.*

A tree in many parts of the island. — *B.C.S., Schweinf., Bent, Wellsted.*

FIG. 1.



YOUNG CUCUMBER TREES.

(Grown in Royal Botanic Gardens, Edinburgh.)

In the *Botany of Socotra* I was unable to give a complete description of the plant as much of our material had been lost. The plants we have growing and the material which Dr. Forbes brought home in spirit will enable us eventually to make out an account of the structure of this interesting plant. The late Mr. Theodore Bent brought home some fragments, upon which there happened to be two female flowers, and amongst the specimens Dr. Forbes collected are two female flowers and a young fruit in spirit. I am able, therefore,

now, from the additional material at my disposal, to supplement the description already published by the description of the female flower, and to give figures of it :—

FIG. 2.



FIG. 3.



FIG. 4.

YOUNG FLOWERS AND FRUIT OF *DENDROSICYOS SOCOTRANA*.

(Fig. 2. In bud. Fig. 3. Open flower. Fig. 4. Young fruit.)

Flores ♀ in fasciculos axillares pedunculatos aggregati, fasciculi rhachis crassus pubescens; bracteae obcuneatae trinerviae tricuspidatae; pedicelli $\frac{1}{2}$ poll. longi. Calycis tubus supra ovarium $\frac{3}{5}$ poll. longus poculiformis subcrassus extus hirsutus et jugis basi gibbosis quinque sepalis respondentibus vallecule quaque medio costata notatus, intus glaber. Sepala 5 linearia acuta v. apice subulata $\frac{3}{16}$ longa hirsuta. Petala 5 libera integra oblonga $\frac{3}{8}$ poll. longa fauci calycis inserta costata extus dense pubescentia apice obtusa subconcava marginibus frequenter involuta. Staminodia 5, quatuor per paria antipetala, filiformia breviter glabra apice paullo expansa v. subbifida. Ovarium angustatum ovoideum sursum in rostrum costatum attenuatum, pilis brevibus plus minusve vestitum, triloculare. Stylus elongatus ramis tribus stigmatiferis corollae aequilongus; stigmata expansa cristata.

Discus o. Ovula plurima horizontalia lateribus placentarum ovarii parieti proximis inserta.

The position of the genus is by this shown to be amongst the *Cucumerinæ*. But it is a unique plant. No other form is known having the tree-character it possesses. Six plants, 4 in a Wardian case and 2 in a dry condition, were brought over. Those in the Wardian case were in excellent health, rooting in the soil and sending out leaves. A great triumph. (All alive December, 1900.) The annexed figure (fig. 1) shows two of these plants.

BEGONIACEÆ.

Begonia, Linn.

193. † * *Begonia socotrana*, Hook. fil., Bot. Mag. t. 6555.

Observed in the valley of the Dinehan on our ascent to Adho Dimellus, growing in fine friable soil, but nowhere below 1500 feet; seen also growing abundantly in the crevices of the exposed faces of granite rocks at 4200 feet. Sabirbiroh is the native name given to us.—*H.O.F.* On the Haghier hills under the shade of boulders.—*B.C.S., Schweinf., Bent.* This plant, introduced in 1880 from the island has been the progenitor of an entirely new race of *Begonias*. I think that in some of the other plants we now have in cultivation from the seeds and bulbs brought home by the expedition there are possibilities which will render them acquisitions in a like way. Some of these are certainly of themselves horticulturally valuable.

FICOIDEÆ.

Tetragonia, Linn.

194. † *Tetragonia pentandra*, Balf. fil.

Near Galonsir.—*B.C.S.*

Aizoon, Linn.

195. *Aizoon canariense*, Linn.

Common on the plains.—*B.C.S., Schweinf.*

Trianthema, Linn.

196. *Trianthema pentandra*, Linn.

Near Hadibu.—*B.C.S., Schweinf.*

Orygia, Forsk.

197. * *Orygia decumbens*, Forsk.

Hadibu Plain (XII. 98, No. 105).—*H.O.F.*

Common on the plains of Galonsir, Hadibu and elsewhere.—*B.C.S., Schweinf.*

Several seedlings of this, from seed brought by the expedition, we have now in cultivation.

Mollugo, Linn.**198. Mollugo hirta, Thunb.**

Near Galonsir.—*B.C.S.*

UMBELLIFERÆ.**Hydrocotyle, Linn.****199. * Hydrocotyle asiatica, Linn.**

On the swampy bank of a stream near Houhbil.—*H.O.F.*

On banks of many streams.—*B.C.S., Schweinf.*

Nirarathamnos, Balf. fil.**200. † * Nirarathamnos asarifolius, Balf. fil., Op. cit. Tab. VII, A.**

The flowers were over, and the fruits were fully formed, but not ripe in February. The native name given to us was "Dosaf."

Adho Dimellus (4300 ft., No. 236).—*H.O.F.*

Near the summit of Sicante, south from Hadibu, at 4000 ft.—*B.C.S.*

Plants of this species brought home in a Wardian case did not survive, and the seed of it was not ripe, so that this remarkable plant is not yet in cultivation.

Carum, Linn.**201. † Carum (Trachyspermum) pimpinelloides, Balf. fil.**

On shore between Khadup and Galonsir.—*B.C.S.*

202. † Carum (Trachyspermum) calcicolum, Balf. fil.

Common on limestone plains near the sea.—*B.C.S.*

Fœniculum, Adans.**203. Fœniculum vulgare, Gärtn.**

Cultivated at Galonsir.—*B.C.S.*

Peucedanum, Linn.**204. † * Peucedanum cordatum, Balf. fil.**

Adho Dimellus (2. H. 99, 4000 ft.). Fruits collected.—*H.O.F.*

Common on the hills.—*B.C.S., Schweinf., Bent.*

A good crop of this has been raised from seed brought by the expedition.

It is a pretty pot plant, but will hardly command attention.

GAMOPETALÆ.**RUBIACEÆ.****Dirichletia, Klotzsch.****205. * Dirichletia glaucescens, Hiern.**

Observed at the base of Gebel Raggit, south-west of Hadibu.—*H.O.F.*

On Haghier hills, south of Hadibu.—*B.C.S., Schweinf.*

206. † * **Dirichletia venulosa**, *Balf. fil.*, Op. cit. Tab. XXVII, C.
Hamaderu (2000 ft., 26. I. 99) : Adho Dimellus (4000 ft.). (Nos. 226, 230.)—*H.O.F.*
Only on the higher parts of Haghier.—*B.C.S.*, *Schweinf.*, *Bent.*
207. † * **Dirichletia lanceolata**, *Balf. fil.*
Adho Dimellus (3500 ft., II. 99, No. 223).—*H.O.F.*
On Haghier hills south from Hadibu, and elsewhere.—*B.C.S.*
208. † * **Dirichletia obovata**, *Balf. fil.*, Op. cit. Tab. XXVII, A.
Garieh Plain (Nos. 192, 194).—*H.O.F.*
Common everywhere on the hills.—*B.C.S.*, *Bent.*
One seedling has come up from our sowing of this plant brought by the expedition.
209. † **Dirichletia obovata**, var. **albescens**, *Balf. fil.*, Op. cit. Tab. XXVII, B.
On the limestone plains about Galonsir.—*B.C.S.*, *Schweinf.*

Placopoda, *Balf. fil.*

210. † **Placopoda virgata**, *Balf. fil.*, Op. cit. Tab. XXVIII.
Abundant on the plains.—*B.C.S.*, *Schweinf.*, *Bent.*
211. † **Placopoda virgata**, var. **nana**, *Balf. fil.*
On the plains. — *B.C.S.*

Hedyotis, *Linn.*

212. † **Hedyotis pulvinata**, *Balf. fil.*
Very common on the plains about Galonsir.—*B.C.S.*, *Schweinf.*, *Bent.*
213. † **Hedyotis bicornuta**, *Balf. fil.*
Near Galonsir.—*B.C.S.*
214. † **Hedyotis stellarioides**, *Balf. fil.*
Common on hill slopes.
Near Kischen.—*B.C.S.*, *Bent.*

Oldenlandia, *Linn.*

215. **Oldenlandia Schimperii**, *T. Anders.*
On the plains.—*B.C.S.*, *Schweinf.*
216. **Oldenlandia corymbosa**, *Linn.*
Common.—*B.C.S.*, *Schweinf.*
217. **Oldenlandia Heynei**, *Oliv.*
Not uncommon on the hill slopes.—*B.C.S.*, *Schweinf.*

Mussænda, Linn.

218. † *
- Mussænda capsulifera**
- ,
- Balf. fil.*
- , Op. cit. Tab. XXIX.

Hombil (2000 ft., l. 99, Nos. 171, 182). Adho Dimellus (4000 ft., l. 99, No. 216).—*H.O.F.*

On the hills.—*B.C.S., Schweinf., Bent.*

We have seedlings of this plant raised from seed brought by the expedition. Plants grown at Kew from seeds brought home from Sokotra by Mr. and Mrs. Theodore Bent have flowered, and the plant is figured by Sir Joseph Hooker in the Botanical Magazine, t. 7671.

Gaillonia, Ach. Rich.

219. †
- Gaillonia**
- (
- Microstephus*
-)
- tinctoria**
- ,
- Balf. fil.*

In tufts on rocks near Galonsir.—*B.C.S.*

220. †
- Gaillonia**
- (
- Microstephus*
-)
- puberula**
- ,
- Balf. fil.*

Not uncommon.—*B.C.S., Schweinf.*

221. *
- Gaillonia**
- (
- Microstephus*
-)
- thymoides**
- ,
- Balf. fil.*

Grows everywhere.—*B.C.S., Schweinf., H.O.F.*

Spermacoce, Linn.

- 222.
- Spermacoce hispida**
- ,
- Linn.*

Hadibu.—*B.C.S., Schweinf.*

Vaillantia, DC.

- 223.
- Vaillantia hispida**
- ,
- Linn.*

Hill slopes.—*B.C.S.*

Galium, Linn.

224. *
- Galium Aparine**
- ,
- Linn.*

Adho Dimellus (4000 ft.).—*H.O.F.*

On the higher parts of Haghier.—*B.C.S., Schweinf.*

VALERIANEÆ.**Valerianella, Mönch.**

225. †
- Valerianella affinis**
- ,
- Balf. fil.*

Dry hill slopes near Galonsir.—*B.C.S.*

COMPOSITÆ.**Vernonia, Schreb.**

226. † *
- Vernonia**
- (
- Lepidella*
-)
- Cockburniana**
- ,
- Balf. fil.*
- , Op. cit. Tab. XXX.

Adho Dimellus.—*H.O.F.*

Not uncommon both on the limestone and the granitic regions.—*B.C.S., Schweinf.*

This is one of the few composites that have grown in the Royal Botanic Gardens, Edinburgh, from seed brought by the expedition.

227. Vernonia (Tephrodes) **spathulata**, *Hochst.*

Plains about Galonsir. — *B.C.S.*

228. Vernonia (Tephrodes) **cinerea**, *Less.*

Common. — *B.C.S.*, *Schweinf.*

Ageratum, *Linn.*

229. * Ageratum conyzoides, *Linn.*

Garich Plain. — *H.O.F.*

About Hadibu. — *B.C.S.*, *Schweinf.*, *Bent.*

This species has grown from seed collected by Dr. Forbes.

Dichrocephala, *DC.*

230. Dichrocephala chrysanthemifolia, *DC.*

Top of the Haghier, above Aduna (over 4000 ft.). — *B.C.S.*

Conyza, *Less.*

231. Conyza Hochstetteri, *Schultz.*

Not common. — *B.C.S.*, *Schweinf.*

Psiadia, *Jacq.*

232. † Psiadia Schweinfurthii, *Balf. fil.*, Op. cit. Tab. XXXI.

Kischen, in Haghier range (at 1800 ft.). — *Schweinf.*

Pluchea, *Cass.*

233. † * Pluchea glutinosa, *Balf. fil.*

Aduna slopes (2800 ft.). — *H.O.F.*

On Haghier range above Hadibu and Kischen; near Galonsir. — *B.C.S.*, *Schweinf.*

234. † * Pluchea aromatica, *Balf. fil.*, Op. cit. Tab. XXXII.

Jena-agahan (1500-2000 ft., 3. I. 99, No. 148). — *H.O.F.*

On Haghier range south of Hadibu and above Kischen. — *B.C.S.*, *Schweinf.*

235. † * Pluchea obovata, *Balf. fil.*, Op. cit. Tab. XXXIII.

Observed on Aduna slopes. — *H.O.F.*

Only on the cliffs on higher parts of Haghier, especially about Kischen and Aduna. — *B.C.S.*, *Schweinf.*, *Bent.*

Achyrocline, *Less.*

236. * Achyrocline luzuloides, *Valke.*

Jena-agahan (1500-2000 ft., 3. I. 99, No. 155). — *H.O.F.*

Very common. — *B.C.S.*, *Schweinf.*, *Nimm.*

237. Achyrocline Schimperii, Schultz.

On the hills.—*B.C.S., Schweinf., Bent.*

Helichrysum, Gärt.**238. † * Helichrysum rosulatum, Oliv. & Hiern., Balf., Op. cit. Tab. XXXIV, A.**

Observed high up (4200 ft.), on the slope of Gebel Dryat, or Ferah, as it is also called (the highest peak of the Haghier range), above our camp at Adho Dimellus (3. II. 99).—*H.O.F.*

On the highest points of the Haghier range (over 4000 ft.).—*B.C.S., Schweinf., Bent, Nimmo.*

239. † * Helichrysum sphærocephalum, Balf. fil.

Adho Dimellus (4000 ft., No. 214).—*H.O.F.*

On higher Haghier hills.—*B.C.S., Schweinf., Bent.*

The two plants of this species, in which on arrival life was flickering, did not survive.

240. † Helichrysum sphærocephalum, var. sarmentosum, Balf. fil.

In dry localities.—*B.C.S.*

241. † * Helichrysum arachnoides, Balf. fil.

Hombil (2700 ft., No. 185).—*H.O.F.*

On hills south-west from Galonsir.—*B.C.S.*

242. † * Helichrysum aciculare, Balf. fil., Op. cit. Tab. XXXIV, B.

Hombil; fruits collected by the expedition.—*H.O.F.*

Tops of the Haghier hills (over 2500 ft.).—*B.C.S., Schweinf., Bent.*

243. † * Helichrysum Nimmoanum, Oliv. & Hiern., Balf., Op. cit. Tab. XXXV.

High up in the Nesharir valley, under Aduna, and above our camp at Dahamnis (about 3000 ft.).—*H.O.F.*

On the higher slopes of Haghier.—*B.S.C., Schweinf., Bent, Nimmo.*

244. † * Helichrysum suffruticosum, Balf. fil., Op. cit. Tab. XXXVI.

Fruits of this species were collected by the expedition.—*H.O.F.*

On higher parts of Haghier.—*B.C.S., Schweinf.*

245. † * Helichrysum gracilipes, Oliv. & Hiern., Balf., Op. cit. Tab. XXXVII.

Slopes of Aduna (21. XII. 98, Nos. 113, 133). Hamaderu summit, above Hombil camp (2000 ft., No. 161). Adho Dimellus (4000 ft., No. 209).—*H.O.F.*

Wadi Kischen (1900-3000 ft.).—*B.C.S., Schweinf., Bent, Nimmo.*

246. † Helichrysum gracilipes, var. lanatum, Balf. fil.

Shore near Hadibu.—*Schweinf.*

247. † Helichrysum gracilipes, var. profusum, Balf. fil.

Near Keregnigiti.—*Schweinf.*

248. † **Helichrysum gracilipes**, var. **stoloniferum**, *Balf. fil.*

Hills south-west of Galonsir.—*B.C.S.*, *Nimm.*

Pulicaria, *Gärtn.*

249. † * **Pulicaria diversifolia**, *Balf. fil.*

Jena-agahan (1500-1800 ft., I. 99, Nos. 156, 158).—*H.O.F.*

Very common on the plains.—*B.C.S.*, *Schweinf.*

250. † **Pulicaria stephanocarpa**, *Balf. fil.*, Op. cit. Tab. XXXVIII.

The commonest plant of plains at Galonsir and Nuget.—*B.C.S.*, *Schweinf.*

251. † **Pulicaria vieræoides**, *Balf. fil.*, Op. cit. Tab. XXXIX.

On Haghier range south of Hadibu (over 2000 ft.).—*B.C.S.*

Siegesbeckia, *Linn.*

252. **Siegesbeckia orientalis**, *Linn.*

On hills near Ray village and elsewhere.—*B.C.S.*, *Schweinf.*

Eclipta, *Linn.*

253. **Eclipta alba**, *Hassk.*

Near Hadibu.—*B.C.S.*, *Schweinf.*

Blainvillea, *Cass.*

254. * **Blainvillea rhomboidea**, *Cass.*

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 143).—*H.O.F.*

Not uncommon.—*B.C.S.*, *Schweinf.*

Bidens, *Linn.*

255. * **Bidens pilosa**, *Linn.*

Adho Dimellus (4000 ft., No. 225).—*H.O.F.*

Hadibu.—*B.C.S.*, *Schweinf.*

Senecio, *Linn.*

256. † **Senecio** (*Kleinia*) **Scotti**, *Balf. fil.*, Op. cit. Tab. XL.

Haghier range above Hadibu (over 2500 ft.). Rare.—*B.C.S.*, *Schweinf.?*

Euryops, *Cass.*

257. † * **Euryops socotranus**, *Balf. fil.*, Op. cit. Tab. XLI.

Slopes of Aduna (1500-2000 ft., No. 127). Never collected below 1500 ft. *Begonia*, *Hypericum* and *Euryops* appear suddenly at about this elevation.—*H.O.F.*

We have thirteen plants of this, which came home alive in a Wardian case : and we have also a large crop of seedlings. It will be a useful decorative plant for the green-house.

On higher regions of Haghier.—*B.C.S., Schweinf., Bent, Hunter.*

Tripteris, Less.

258. **Tripteris Lordii**, *Oliv. & Hiern.*, var. **racemosa**, *Balf. fil.*

Near Galonsir and Hadibu.—*B.C.S., Schweinf.*

Volutarella, Cass.

259. **Volutarella Lippii**, *Cass.*

Near Hadibu.—*B.C.S.*

Dicoma, Cass.

260. **Dicoma tomentosa**, *Cass.*

Haghier range near Hadibu.—*B.C.S., Schweinf.*

261. † **Dicoma cana**, *Balf. fil.*, *Op. cit.* Tab. XLII.

Cliffs overhanging the shore on south-west of Galonsir (over 1500 ft.).

On limestone.—*B.C.S., Bent, Hunter.*

Lactuca, Linn.

262. † **Lactuca rhynchocarpa**, *Balf. fil.*

On the plains.—*B.C.S., Schweinf.*

263. † **Lactuca crassifolia**, *Balf. fil.*

On the plains.—*B.C.S.*

Heterachæna, Fresen.

264. **Heterachæna massaviensis**, *Fresen.*

Common.—*B.C.S., Schweinf.*

Prenanthes, Linn.

265. † * **Prenanthes amabilis**, *Balf. fil.*, *Op. cit.* Tab. XLIII.

Observed below the Adho Dimellus Pass.—*H.O.F.*

On rocks south-west of Galonsir (over 1500 ft.).—*B.C.S.*

Reichardia, Roth.

266. **Reichardia tingitana**, *Roth.*

Galonsir.—*B.C.S., Schweinf.*

Sonchus, Linn.

267. * **Sonchus oleraceus**, *Linn.*

Observed in many places.—*H.O.F.*

Common near habitations.—*B.C.S.*

Launæa, Cass.**268. † Launæa crepoides, Balf. fil.**

Not uncommon on the hills.—*B.C.S., Schweinf.*

CAMPANULACEÆ.**Wahlenbergia, Schrad.****269. * Wahlenbergia riparia, Alph. DC.**

Observed in the Dinehan valley leading from Hadibu Plain to Adho Dimellus.—*H.O.F.*

On hills about Galonsir.—*B.C.S.*

Campanula, Linn.**270. Campanula dichotoma, Linn.**

Hill slopes.—*B.C.S.*

PLUMBAGINEÆ.**Statice, Linn.****271. * Statice axillaris, Forsk.**

Hombil (I. 99, No. 181). Adho Dimellus (4000 ft., II. 99, No. 224).—*H.O.F.*

Not uncommon.—*B.C.S., Nimmo.*

272. * Statice cylindrifolia, Forsk.

In the swampy ground near Khor Garieh.—*H.O.F.*

In the clay margins of Khor Garieh and on Nuget Plain.—*B.C.S., Bent.*

Vogelia, Lamk.**273. Vogelia indica, Gibs., var. socotrana, Balf. fil.**

Slopes of Haghier.—*B.C.S., Schweinf., Bent.*

274. † * Vogelia pendula, Balf. fil., Op. cit. Tab. XLIV.

Adho Dimellus (3500 ft., II. 99, No. 212).—*H.O.F.*

Slopes of Haghier, south from Hadibu.—*B.C.S., Schweinf.*

PRIMULACEÆ.**Anagallis, Linn.****275. * Anagallis arvensis, Linn., var. cærulea, Lamk.**

Hadibu Plain (XII. 98, No. 107). Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 112).—*H.O.F.*

Abundant.—*B.C.S.*

MYRSINEÆ.**Myrsine, Linn.****276. * Myrsine africana, Linn.**

Collected, locality doubtful.—*H.O.F.*

Shrub of the higher Haghier.—*B.C.S.*

SAPOTACEÆ.**Sideroxylon, Linn.****277. † Sideroxylon fimbriatum, Balf. fil.**

In valley opening upon Khadup Plain. Not abundant.—*B.C.S.*

EBENACEÆ.**Euclea, Linn.****278. † * Euclea laurina, Hiern.**

"Adho Dimellus (4000 ft., II. 99, No. 220). The young stems are chewed by the natives, and the chewed out end is used as a tooth brush, under the name of 'Kelle,' but this is not the plant of the same native name, given to Dr. Schweinfurth, used for the same purpose, which is *Burus Hildebrandtii*."—*H.O.F.*

We have reared seedlings of what is apparently this plant.

On Haghier and near Galonsir.—*B.C.S.*

279. † Euclea Balfourii, Hiern.

On Haghier hills.—*B.C.S.*, *Schweinf.*

280. Euclea Kellau ?, Hochst.

Abundant.—*B.C.S.*

281. Euclea, sp. ?

On Haghier.—*B.C.S.*

282. Euclea, sp. ?

On Haghier.—*B.C.S.*

OLEACEÆ.**Jasminum, Linn.****283. † * Jasminum rotundifolium, Balf. fil., Op. cit. Tab. XLV.**

Observed in the valley running south from Adho Dimellus (3500 ft.).
—*H.O.F.*

Abundant on the eastern plateau of the island, but it occurs also on the Haghier.—*B.C.S.*, *Schweinf.*, *Bent.*

SALVADORACEÆ.**Salvadora, Linn.****284. * Salvadora persica, Linn.**

Near Hadibu.—*H.O.F.*, *B.C.S.*

APOCYNACEÆ.**Carissa, Linn.****285. Carissa Schimper, Alph. DC.**

Not uncommon.—*B.C.S.*, *Schweinf.*

Socotora, *Balf. fil.*

- 286.
- Socotora aphylla**
- ,
- Balf. fil.*
- , Op. cit. Tab. XLVI.

Hill slopes south-west of Galonsir.—Rare.—*B.C.S.*

Adenium, *Ræm. et Schult.*

287. *
- Adenium multiflorum**
- ,
- Klotzsch.*

Aduna slopes (400-1500 ft., 21. XII. 98, No. 116). Hombil (1500 ft., No. 160).—*H.O.F.*

A number of plants, some in a Wardian case, but the majority packed dry, arrived in excellent condition, and are all alive (I. 1902) in the Royal Botanic Garden, Edinburgh.

Abundant on hills.—*B.C.S.*, *Schweinf.*, *Bent*, *Wellsted*.

ASCLEPIADEÆ.**Ectadiopsis**, *Benth.*

288. †
- Ectadiopsis volubilis**
- ,
- Balf. fil.*
- , Op. cit. Tab. XLVII.

Common on limestone and granitoid regions of the island.—*B.C.S.*, *Schweinf.*

289. †
- Ectadiopsis brevifolia**
- ,
- Balf. fil.*

On limestone plateau south-west from Galonsir (over 1500 ft.).—*B.C.S.*

- 290.
- Ectadiopsis**
- ,
- sp. ?*

Near Khadup.—*B.C.S.*

Mitolepis, *Balf. fil.*

291. †
- Mitolepis intricata**
- ,
- Balf. fil.*
- , Op. cit. Tab. XLVIII.

Hills near Khadup and Kischen.—*B.C.S.*, *Schweinf.*

Cochlanthus, *Balf. fil.*

292. † *
- Cochlanthus socotranus**
- ,
- Balf. fil.*

Observed in valley running south from the Adho Dimellus Pass.—*H.O.F.*

On Haghier hills (over 3000 ft.).—*B.C.S.*

Secamone, *R. Br.*

293. †
- Secamone socotrana**
- ,
- Balf. fil.*
- , Op. cit. Tab. L.

Haghier range. Near Dimux, eastern plateau of island.—*B.C.S.*, *Schweinf.*, *Bent*.

Glossonema, *Decne.*

294. *
- Glossonema Revoili**
- ,
- Franch.*

Hadibu Plain (No. 102).—*H.O.F.*

Galonsir Plain and elsewhere.—*B.C.S.*, *Schweinf.*, *Bent*.

295. * *Glossonema Boveanum*, *Dene*.

Observed near our camp at Homhil (1500 ft.), the identical species I had seen in the desert in S. Arabia, between Lahej and Sheikh Othman.—*H.O.F.*

This extends its distribution to the Asiatic Continent.

Edithcolea, *N. E. Br.*296. *Edithcolea sordida*, *N. E. Brown*, *sp. nov.*

Pedicelli $\frac{1}{2}$ poll. longi, crassi, glabri. Sepala $2\frac{1}{2}$ -3 lin. longa, $1\frac{1}{2}$ - $1\frac{3}{4}$ lin. lata, ovata, acuminata, apice recurva, glabra. Corolla magna, exsiccata $3\frac{1}{2}$ poll. diam., extra glabra, levis, intra tuberculato-rugosa, atropurpurea, secundum margines et prope apicem loborum et practerea secundum lineas 5 e centro ad sinus radiantes pilis clavatis purpureis ornata; tubus parvus, circiter $1\frac{1}{2}$ lin. altus, 3 lin. diam.: limbus maximus ultra medium 5-lobus disco vel parte indiviso lato probabiliter patelliformi, lobis exsiccatis $1\frac{1}{4}$ poll. longis, 7-8 lin. latis, oblongo-lanceolatis, acutis, apice recurvis. Coronae exterioris lobi vix $\frac{1}{2}$ lin. longi, acute bifidi, saecati, intra hirti. Coronae interioris lobi $\frac{3}{4}$ lin. longi, basi lineares erecti, apice triangulari-dilati, antheris incumbentes, tuberculati.

This differs from the only other species of *Edithcolea* at present known (*E. grandis*, *N. E. Brown*), by the different colour and more oblong lobes of the corolla, which is densely tuberculate-rugose, instead of having concentric raised ridges as in *E. grandis*.—*N. E. Br.*

Mr. *N. E. Brown*, of Kew, has kindly examined and described this plant. [This species (No. 145) grew in considerable abundance on the low granite hills in the Garieh Plain; and also round our camp at Jena-agahan. Our Somali boys said they knew it well in the hills of their own country, where they chewed the leaves. These of the Sokotran plant were, however, they said, more bitter than their own plant. The Sokotri name is Mushharmohum.—*H.O.F.*]

Calotropis, *R. Br.*297. *Calotropis procera*, *R. Br.*

Near Galonsir and elsewhere.—*B.C.S.*

Vincetoxicum, *Mönch.*298. † *Vincetoxicum linifolium*, *Balf. fil.*, *Op. cit.* Tab. LI.

Not uncommon.—*B.C.S.*

Sarcostemma, *R. Br.*299. *Sarcostemma Daltoni*, *Dene*.

On the plains. Specially abundant near Debeni.—*B.C.S.*, *Bent.*

300. *Sarcostemma*, *sp.*

On the plains.—*B.C.S.*

301. **Sarcostemma**, *sp.*

On the plains.—*B.C.S.*

Dæmia, *R. Br.*302. **Dæmia angolensis**, *Dene.*

Common.—*B.C.S.*, *Schweinf.*, *Bent.*

Marsdenia, *R. Br.*303. † * **Marsdenia robusta**, *Balf. fil.*, Op. cit. Tab. LII.

On Garieh Plain.—*H.O.F.*

Near Galonsir and Khadup.—*B.C.S.*, *Schweinf.*, *Bent.*

Echidnopsis, *Hook. fil.*304. **Echidnopsis cereiformis**, *Hook. fil.*

Limestone hills, north-west from Galonsir.—*B.C.S.*, *Bent* (?)

Boucerosia, *Wight et Arn.*305. † **Boucerosia socotrana**, *Balf. fil.*

Limestone plains. Hill slopes at low altitudes.—*B.C.S.*, *Schweinf.*, *Bent.*

306. **Boucerosia**, *sp.*

Limestone hills west from Hadibu. Near Galonsir.—*B.C.S.*, *Schweinf.*

307. **Boucerosia**, *sp.*

On plains.—*B.C.S.*

GENTIANEÆ.**Exacum**, *Linn.*308. † * **Exacum cæruleum**, *Balf. fil.*, Op. cit. Tab. LIII.

Adho Dimellus (4000 ft., II. 99, No. 222). Growing with its roots tightly jammed in the seams of the granite rocks. Rich deep blue in colour, and with a sweet perfume. On the summits of both Hamaderu and Matagoti, above our Hombil camp, in the limestone crevices, white varieties occurred.—*H.O.F.*

On higher parts of Haghier hills (at 2500 ft.).—*B.C.S.*, *Schweinf.*, *Bent.*

Plants of this brought in a Wardian case all failed.

309. **Exacum Forbesii**, *Balf. fil.*, *sp. nov.* (Plate xxvi. A).

Pereunis $\frac{1}{2}$ pedalis glaber erectus ramosus, caule tetragono, ramis elongatis 4-angulatis. Folia sessilia nitida $\frac{1}{2}$ poll. longa ovata v. elliptica acuta coriacea margine subcartilagineo trinervia ad basin quinquenervia. Flores pedicellati mutantes medioeri pentameri in diebasia terminalia $\frac{1}{2}$ -ramosa aggregati, pedicelli virides v. purpurei 1 poll. longi. Calycis lobi anguste elliptici acuminati. Corollæ segmenta elliptica subacuta

$\frac{3}{8}$ poll. longa. Filamenta brevia recurvata, antheræ oblongæ exsertæ ab apice ad medium dehiscentes. Stylus decurvatus ovario duplo longior, stigma spongiosa.

Sokotra.

A species nearly allied to *Exacum ceruleum*, Balf. fil., but differing conspicuously in the colour of the flower and the size of its parts. From seeds gathered by Dr. Forbes a number of plants have been raised in the Royal Botanic Garden, Edinburgh, and they have flowered freely.

It is a charming addition to our winter-flowering plants of the intermediate house, and it is interesting to find a second species of the genus from Sokotra of horticultural value. *Exacum affine* is a Sokotran plant now not uncommon in cultivation, but it is a poor plant compared with *Exacum Forbesii*. The latter has the advantage of being perennial, with a foliage of fine glossy green. It bears free cutting back, and can be readily trimmed into a neat compact form. Its sweet-scented flowers stand up nicely in small trusses above the foliage, and it has the further merit of coming into flower in late autumn, like *Begonia sokotrana*, and continuing in bloom for many weeks. Of itself a decorative plant, it will, I believe, prove useful for crossing with other species.

310. † * **Exacum affine**, Balf. fil.

“Homhil (2000 ft., No. 176). In the valleys north and south of the Adho Dimellus Pass, growing on the damp swampy margins of the stream. Not seen in the Haghier valleys below 2000 ft. No perfume observed in this species as in *E. ceruleum*. White varieties were observed.”—H.O.F.

We have raised a good crop of this popular biennial from seed brought home by the expedition.

Not at all uncommon beside the streams.—B.C.S., Schweinf., Bent.

311. † **Exacum gracilipes**, Balf. fil.

On dry spots of the hill slopes.—B.C.S., Bent.

Erythræa, L. C. Rich.

312. **Erythræa Centaurium**, Pers.

On hill slopes. Abundant.—B.C.S.

BORAGINEÆ.

Cordia, Linn

313. † * **Cordia obovata**, Balf. fil.

H.O.F.

Common.—B.C.S., Schweinf.

314. † **Cordia obtusa**, Balf. fil.

Hills near Galonsir.—B.C.S.

315. *Cordia Rothii*, Balf. fil.

On Haghier range.—*B.C.S.*

Ehretia*, Linn.*316. *Ehretia obtusifolia*, Hochst.**

On the hills.—*B.C.S.*, *Schweinf.*

317. *Ehretia*, sp.

On the hills.—*B.C.S.*

Heliotropium*, Linn.*318. *Heliotropium* (Catinas) *zeylanicum*, Lamk.**

On Haghier hills.—*B.C.S.*, *Schweinf.*

319. † *Heliotropium* (Monimanthus) *dentatum*, Balf. fil.

Plains about Galonsir, Hadibu and elsewhere.—*B.C.S.*, *Schweinf.*

320. * *Heliotropium undulatum*, Vahl.

Kamahana Hill in Garieh Plain (800 ft., l. 99, No. 145).—*H.O.F.*

Very common.—*B.C.S.*, *Schweinf.*, *Nimmo*.

321. *Heliotropium rariflorum*, Stocks.

Haghier range near Hadibu.—*B.C.S.*, *Schweinf.*

322. *Heliotropium* (Heliophytum) *pterocarpum*, Hochst. & Steud.

On slopes of Haghier.—*B.C.S.*

323. † * *Heliotropium* (Heliophytum) *odorum*, Balf. fil.

In valley leading south from camp at Adho Dimellus.—*H.O.F.*

On Haghier hills.—*B.C.S.*, *Schweinf.*, *Bent.*

324. *Heliotropium* (Orthostachys) *ovalifolium*, Forsk.

On the plains.—*B.C.S.*

325. * *Heliotropium* (Orthostachys) *strigosum*, Willd.

Hombil (No. 159).—*H.O.F.*

On the plains.—*B.C.S.*, *Schweinf.*

326. *Heliotropium strigosum*, Willd., var. *scabrum*, Retz.

On the plains.—*B.C.S.*, *Schweinf.*

327. *Heliotropium strigosum*, Willd., var. *marifolium*, Retz.

On the plains.—*B.C.S.*

328. † *Heliotropium* (Orthostachys) *nigricans*, Balf. fil., Op. cit.

Tab. LIV, B.

Shrubby plant of plains.—*B.C.S.*, *Bent.*

Trichodesma, R. Br.**329. † * Trichodesma Scotti, Balf. fil., Op. cit. Tab. LV.**

Tops of Matagoti and Hamaderu, above our Hombil camp (2200 ft., Nos. 169, 175.) Adho Dimellus, growing at 4000 ft. in broad masses, both in the sun and under the deep shade.—*H.O.F.*

Five plants were brought over in a Wardian case and are alive and healthy (I. 1902). A number of seedlings have also been raised in the Royal Botanic Garden, of which one has flowered.

Higher parts of Haghier hills (over 2500 ft.).—*B.C.S., Schweinf., Bent.*

330. † * Trichodesma microcalyx, Balf. fil.

Adho Dimellus (4000 ft., No. 196). Hombil. Aduna slopes.—*H.O.F.*

On Haghier range near Aduna.—*B.C.S., Schweinf., Bent., Nimmo.*

331. † * Trichodesma laxiflorum, Balf. fil.

Adho Dimellus (4000 ft., No. 188). Growing luxuriantly under the shade. Flowers occasionally white.—*H.O.F.*

Plants of this pretty blue-flowered species have been raised from seed brought home by the expedition, and have flowered in the Royal Botanic Garden, Edinburgh.

Common.—*B.C.S., Schweinf., Bent.*

Cystistemon, Balf. fil.**332. † * Cystistemon socotranus, Balf. fil., Op. cit. Tab. LVI.**

Hombil (1700 ft.), on Matagoti (No. 157). Hombil (2000 ft.), on Hamaderu, with white flowers (No. 184). Adho Dimellus (4000 ft.), white flowers also observed. General colour deep blue.—*H.O.F.*

On limestone cliffs (over 1500 ft.).—*B.C.S., Schweinf., Bent.*

A seedling of this interesting plant was raised in the Royal Botanic Garden, Edinburgh, but, as is the way with many boraginaceous plants in cultivation, it suddenly died off.

CONVOLVULACEÆ.**Ipomœa, Linn.****333. * Ipomœa obscura, Ker.**

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 140).—*H.O.F.*

Not uncommon.—*B.C.S., Schweinf., Bent.*

334. * Ipomœa biloba, Forsk.

On the shores.—*B.C.S., Schweinf., H.O.F.*

335. † Ipomœa (Quamoclit) laciniata, Balf. fil.

Plains near Galonsir.—*B.C.S.*

336. Ipomœa (Pharbitis) scabra, Forsk.

On the hills.—*B.C.S., Bent.*

337. * *Ipomœa* (Aniseia) *cardiosepala*, Hochst.

Hadibu Plain (XII. 98, No. 104). Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 125). ?Tubers eaten by the natives.—*H.O.F.*

Plants of this from seed brought by the Expedition have flowered in the Royal Botanic Garden, Edinburgh.—*B.C.S., Schweinf.*

Convolvulus*, Linn.*338. † * *Convolvulus filipes*, Balf. fil.**

On all the plains.—*B.C.S., Schweinf., H.O.F.*

339. † *Convolvulus sarmentosus*, Balf. fil.

Limestone plateau overlooking Galonsir on the west (over 1500 ft.).—*B.C.S.*

340. *Convolvulus glomeratus*, Choisy.

Plains and hill slopes.—*B.C.S., Schweinf., Bent.*

341. *Convolvulus siculus*, Linn.

Near Galonsir.—*B.C.S., Schweinf.*

Evolvulus*, Linn.*342. * *Evolvulus alsinoides*, Linn.**

Common.—*B.C.S., Bent, H.O.F.*

Porana*, Burm.*343. * *Porana obtusa*, Balf. fil.**

West end of Khadup Plain.—*B.C.S., H.O.F.*

Breweria*, R. Br.*344. *Breweria* (Seddera) *latifolia*, Benth.**

On the plains.—*B.C.S., Schweinf.*

345. † *Breweria* (Seddera) *pedunculata*, Balf. fil.

On the plains.—*B.C.S.*

346. † *Breweria* (Seddera) *glomerata*, Balf. fil.

On the plains.—*B.C.S., Schweinf., Bent.*

347. † *Breweria* (Seddera) *fastigiata*, Balf. fil., Op. cit. Tab. LVIII

On the plains.—*B.C.S., Schweinf., Bent.*

Dichondra*, Forst.*348. * *Dichondra repens*, Forst.**

Not uncommon.—*B.C.S., Schweinf., H.O.F.*

Cressa*, Linn.*349. *Cressa cretica*, Linn.**

Sandy plains.—*B.C.S.*

Cuscuta, *Linn.***350. * Cuscuta planiflora**, *Tenore*, var. **globulosa**, *Balf. fil.*

Homhil, on Matagoti hill (1700 ft.), parasitic on *Helichrysum gracilipes* (No. 180).—*H.O.F.*

Common. Parasitic on *Vernonia cinerascens*, Sch. Bip. ; *Indigofera intricata*, Boiss. ; and *Dicliptera effusa*, Balf. fil.—*B.C.S.*, *Bent.*

351. Cuscuta chinensis, *Lamk.*

Common on many plants.—*B.C.S.*, *Schweinf.*, *Bent.*

SOLANACEÆ.**Solanum**, *Linn.***352. * Solanum nigrum**, *Linn.*

Fruits collected on Gebel Matagoti (19. I. 99, 2000 ft.) ; Kamahanu (28. XII. 98) ; Adho Dimellus (3800 ft.).—*H.O.F.*

Plants of this species, raised from Sokotran seed, have flowered in the Royal Botanic Garden, Edinburgh.—*B.C.S.*, *Schweinf.*

353. * Solanum indicum, *Nees ab. Esenb.*

Jena-agahan (8. I. 99, 800 ft.).—*H.O.F.*

Common near villages.—*B.C.S.*, *Schweinf.*, *Bent.*, *Hunter.*

354. * Solanum gracilipes, *Decne.*

Haghier slopes south of Hadibu.—*H.O.F.*

Foot of limestone hills west of Hadibu.—*Schweinf.*

Physalis, *Linn.***355. Physalis minima**, *Linn.*

Near Hadibu.—*Schweinf.*, *Bent.*

Withania, *Pauq.***356. Withania somnifera**, *Dunal.*

Near Hadibu.—*Schweinf.*, *Hunter.*

† * Withania Riebeckii, *Schweinf.*, Op. cit. Tab. LIX.

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 119). Slopes of limestone hills west of Hadibu.—*H.O.F.*

We have plants of this species in the Royal Botanic Garden, Edinburgh, from seeds brought by the expedition, and they have flowered.

On plains near villages.—*B.C.S.*, *Schweinf.*

Lycium, *Linn.***357. Lycium europæum**, *Linn.*

Galonsir and elsewhere.—*B.C.S.*, *Schweinf.*, *Bent.*

Datura, *Linn.*

358. * **Datura fastuosa**, *Linn.*, var. **alba**, *Clarke*.
Common near villages.—*B.C.S.*, *Schweinf.*, *H. O.F.*

SCROPHULARINEÆ.**Anticharis**, *Endl.*

359. **Anticharis arabica**, *Endl.*
Sandy plains.—*B.C.S.*

Linaria, *Juss.*

360. **Linaria** (*Elatinoides*) **hastata**, *R. Br.*
On the plains.—*B.C.S.*, *Schweinf.*

Schweinfurthia, *A. Braun.*

361. **Schweinfurthia pedicellata**, *Benth.* & *Hook.*
On the plains.—*B.C.S.*

Antirrhinum, *Linn.*

362. **Antirrhinum Orontium**, *Linn.*
On Khadup Plain.—*B.C.S.*

Scrophularia, *Linn.*

363. **Scrophularia arguta**, *Ait.*
Hill slopes.—*B.C.S.*, *Schweinf.*

Lindenbergia, *Lehm.*

364. **Lindenbergia sinaica**, *Benth.*
On the plains.—*B.C.S.*, *Schweinf.*

Herpestis, *Gärtn.*

365. **Herpestis Monnieria**, *H. B. K.*
Common in marshy places.—*B.C.S.*, *Schweinf.*

Camptoloma, *Benth.*

366. † **Camptoloma villosa**, *Balf. fil.*
Cliffs of Haghier range (over 3000 ft.).—*B.C.S.*

Campylanthus, *Roth.*

367. † **Campylanthus spinosus**, *Balf. fil.*
Plains near Galonsir and elsewhere.—*B.C.S.*, *Schweinf.*, *Bent.*, *Hunter.*

Striga, *Lour.***368. Striga orobanchoides**, *Benth.*

On the plains. Parasitic on *Fitis*.—*B.C.S.*, *Schweinf.*, *Bent.*

369. Striga hirsuta, *Benth.*

Plains about Galonsir.—*B.C.S.*

Graderia, *Benth.***370. † * Graderia fruticosa**, *Balf. fil.*, *Op. cit.* Tab. LXII.

Adho Dimellus (4200 ft., Nos. 229, 238).—*H.O.F.*

We have seedlings of this species in the Royal Botanic Garden, Edinburgh, from seed brought by the expedition.

Rare. On the slopes of the Haghier hills (at about 3000 ft.). Top of Sicante Peaks, behind Hadibu. Kischen.—*B.C.S.*, *Schweinf.*, *Bent.*

Xylocalyx, *Balf. fil.***371. † Xylocalyx asper**, *Balf. fil.*, *Op. cit.* Tab. LXIII.

Limestone plains near Galonsir and elsewhere.—*B.C.S.*, *Bent.*

OROBANCHACEÆ.**Cistanche**, *Hoffm.***372. † Cistanche lutea**, *Hoffm. et Link.*

Slopes of Aduna (4000 ft., 21. XII. 98, No. 121). Growing in the black soil in the deep shade under the slope of a limestone rock, with no plant near it, so that the roots of its host, which were very deep, must have come from some very considerable distance.—*H.O.F.*

About Galonsir, on species of *Boerhaavia* and other hosts.—*B.C.S.*

373. Cistanche tubulosa, *Wight.*

Near Galonsir.—*B.C.S.*

Orobanche, *Linn.***374. Orobanche** (Osproleon) **abyssinica**, *Ach. Rich.*

On Haghier.—*B.C.S.*, *Schweinf.*, *Bent.*

375. * Orobanche (Osproleon) **cernua**, *Löfl.*

Abundant on many posts.—*B.C.S.*

376. * Orobanche (Trionychon) **ramosa**, *Linn.*

Observed on hills near Hombil and on Aduna slopes.

Near Galonsir on *Lactuca*.—*B.C.S.*

PEDALINEÆ.**Pedaliium, Linn.****377. * Pedaliium Murex, Linn.**

Slopes of Aduna (1000 ft., 21. XII. 98, No. 117). Jena-agahan (10. I. 99). Seeds collected.—*H.O.F.*

Seeds of this which were collected by the expedition were barely ripe, and have not germinated.

Plains about Galonsir, Hadibu, and elsewhere.—*B.C.S., Schweinf., Bent.*

ACANTHACEÆ.**Ruellia, Linn.****378. Ruellia patula, Jacq.**

Plains near Galonsir and elsewhere.—*B.C.S., Schweinf., Bent(?) , Nimmo.*

379. † Ruellia patula, Jacq., var. pubescens, Balf. fil.

B.C.S., Schweinf.

380. † Ruellia patula, Jacq., var. minor, Balf. fil.

B.C.S.

381. † * Ruellia insignis, Balf. fil., Op. cit. Tab. LXIV.

In the Dinehan valley leading from Hadibu Plain to Adho Dimellus Pass.

It was not observed below about 2500 ft., and not above 3600 ft.

Grows in extensive thickets.—*H.O.F.*

I am glad to be able to say that seeds of this beautiful flowered plant have germinated in the Royal Botanic Garden, Edinburgh, and the thriving young plants will, I hope, flower ere long, and enable us to add a charming species to cultivation.

Common on Haghier.—*B.C.S., Schweinf., Bent.*

382. † Ruellia carnea, Balf. fil.

Though eager search was made for *R. carnea*, it was not encountered in the Haghier mountains or the east end of the island.—*H.O.F.*

Plains near Galonsir.—*B.C.S., Schweinf., Bent.*

Blepharis, Juss.**383. Blepharis boerhaaviæfolia, Juss.**

On the plains.—*B.C.S., Schweinf.*

384. † * Blepharis spiculifolia, Balf. fil.

Garieh Plain, at camp under Kamahanu.—*H.O.F.*

On the plains near Hadibu.—*B.C.S., Schweinf.*

Barleria, Linn.**385. † Barleria aculeata, Balf. fil., Op. cit. Tab. LXVII.**

Common on north slopes of the Haghier range.—*B.C.S., Schweinf., Bent.*

386. † * **Barleria tetracantha**, *Balf. fil.*, Op. cit. Tab. LXVIII.
Observed on the low granite hills in the Garieh Plain.—*H.O.F.*
On the plains abundant.—*B.C.S.*, *Schweinf.*, *Bent.*

387. † **Barleria argentea**, *Balf. fil.*
Khadup Plain.—*B.C.S.*

388. **Barleria** *sp. aff.* **B. Lawii**, *T. Anders.*
Collected by Bent.

Of this plant only a fragmentary specimen exists in the Bent collection,
and the affinity has been determined as above by Mr. C. B. Clarke.

Neuracanthus, *Nees ab. Esenb.*

389. † **Neuracanthus aculeatus**, *Balf. fil.*, Op. cit. Tab. LXIX, A.
On the plains.—*B.C.S.*

390. † **Neuracanthus capitatus**, *Balf. fil.*, Op. cit. Tab. LXIX, B.
Dry limestone regions. Khadup Plain.—*B.C.S.*

Asystasia, *Blume.*

391. * **Asystasia coromandeliana**, *Nees ab. Esenb.*
H.O.F.
Common.—*B.C.S.*, *Schweinf.*

Ballochia, *Balf. fil.*

392. † **Ballochia amœna**, *Balf. fil.*, Op. cit. Tab. LXX.
Near Khadup. Near Hadibu, on plains and hill slopes.—*B.C.S.*,
Schweinf., *Bent.*, *Hunter.*
393. † **Ballochia rotundifolia**, *Balf. fil.*, Op. cit. Tab. LXXI, A.
Haghier hills; limestone plateaux south-west from Galonsir (over 1500 ft.).
—*B.C.S.*, *Schweinf.*
394. † **Ballochia atro-virgata**, *Balf. fil.*, Op. cit. Tab. LXXI, B.
Hill slopes.—*B.C.S.*, *Bent.*

Justicia, *Linn.*

395. **Justicia** (*Harnieria*) **heterocarpa**, *T. Anders.*
Near Hadibu. — *B.C.S.*, *Schweinf.*
396. † **Justicia** (*Gendarussa*) **rigida**, *Balf. fil.*, Op. cit. Tab. LXXII.
On the plains.—*B.C.S.*

Trichocalyx, *Balf. fil.*

397. † **Trichocalyx obovatus**, *Balf. fil.*, Op. cit. Tab. LXXIII, A.
On the hills.—*B.C.S.*, *Schweinf.*, *Hunter.*

398. † **Trichocalyx orbiculatus**, *Balf. fil.*, Op. cit. Tab. LXXIII, B.
Hills south-west of Galonsir.—*B.C.S.*, *Bent.*

Anisotes, *Nees ab. Esenb.*

399. † * **Anisotes diversifolius**, *Balf. fil.*, Op. cit. Tab. LXXIV.
Jena-agahan (1500-2000 ft., 3. I. 99, No. 231). In valleys south of
Adho Dimellus Pass (3500 ft., II., 99, No. 233).—*H.O.F.*
On hills near Galonsir and Keregnigiti, vicinity of Hadibu.—*B.C.S.*,
Schweinf., *Bent.*
A pretty flowered acanth, of which we have raised a few seedlings in the
Royal Botanic Garden Edinburgh.

400. † **Anisotes diversifolius**, var. **brevicalyx**, *Balf. fil.*
On Haghier.—*B.C.S.*

Rhinacanthus, *Nees ab Esenb.*

401. † * **Rhinacanthus scoparius**, *Balf. fil.*, Op. cit. Tab. LXXV.
Near Hadibu and elsewhere.—*B.C.S.*, *Schweinf.*

Ancalanthus, *Balf. fil.*

402. † **Ancalanthus paucifolius**, *Balf. fil.*, Op. cit. Tab. LXXVI.
Entrance of valley Ireh opening on Nuget Plain.—*B.C.S.*

Ecbolium, *Kurz.*

403. † * **Ecbolium striatum**, *Balf. fil.*, Op. cit. Tab. LXXVII, A.
Haghier mountains below Adho Dimellus (No. 203).—*H.O.F.*
On Haghier hills (over 2000 ft.).—*B.C.S.*, *Schweinf.*, *Bent.*
404. † **Ecbolium striatum**, var. **minor**, *Balf. fil.*, Op. cit. Tab. LXXVII, B.
Common.—*B.C.S.*

Dicliptera, *Juss.*

405. † **Dicliptera effusa**, *Balf. fil.*
Common.—*B.C.S.*, *Schweinf.*
406. † **Dicliptera ovata**, *Balf. fil.*
Near Hadibu, on hill slopes.—*B.C.S.*

Peristrophe, *Nees ab Esenb.*

407. **Peristrophe bicalyculata**, *Nees ab Esenb.*
Widely distributed.—*B.C.S.*, *Schweinf.*

Hypoestes, R. Br.

408. * **Hypoestes verticillaris**, *R. Br.*, var. **mollis**, *Balf. fil.*

Slopes of Aduna (800 ft., 21. XII. 98, Nos. 120, 138).—*H.O.F.*
Very common.—*B.C.S.*, *Schweinf.*, *Bent.*

409. **Hypoestes verticillaris**, *R. Br.*, var. **denudata**, *Nees.*

410. † **Hypoestes pubescens**, *Balf. fil.*

Haghier hills at considerable elevation.—*B.C.S.*, *Schweinf.*

SELAGINEÆ.**Cockburnia, Balf. fil.**

411. † **Cockburnia socotrana**, *Balf. fil.*, *Op. cit.* Tab. LXXVIII.

Hills above 1000 ft.—*B.C.S.*, *Schweinf.*

VERBENACEÆ.**Lippia, Linn**

412. * **Lippia nodiflora**, *Michx.*

Slopes of Aduna (400-1500 ft., 21. XII. 98, No. 115).—*H.O.F.*
In marshes.—*B.C.S.*, *Bent.*

Priva, Adans.

413. **Priva leptostachya**, *Juss.*

On hill slopes.—*B.C.S.*

Cœlocarpus, Balf. fil.

414. † * **Cœlocarpus socotranus**, *Balf. fil.*, *Op. cit.* Tab. LXXIX.

Adho Dimellus (Nos. 191, 228).—*H.O.F.*

On slopes of hills (over 1000 ft.).—*B.C.S.*, *Bent.*

I have been disappointed in that seeds of this interesting plant have not germinated.

Clerodendron, Linn.

415. † **Clerodendron galeatum**, *Balf. fil.*, *Op. cit.* Tab. LXXX.

On Haghier hills behind Hadibu.—*B.C.S.*

416. † **Clerodendron leucophlœum**, *Balf. fil.*

A common tree.—*B.C.S.*

Avicennia, Linn.

417. * **Avicennia officinalis**, *Linn.*

No. 559.—*H.O.F.*

Khor Hadjin and elsewhere.—*B.C.S.*

LABIATÆ.**Ocimum, Linn.****418. *Ocimum canum*, Sims.**

Everywhere.—*B.C.S., Schweinf.*

Orthosiphon, Benth.**419. *Orthosiphon tenuiflorus*, Benth.**

Abundant.—*B.C.S., Schweinf.*

420. * *Orthosiphon pallidus*, Royle.

Top of Hamaderu, above our Hombil camp (No. 163).—*H.O.F.*

Common.—*B.C.S.*

421. † *Orthosiphon ferrugineus*, Balf. fil.

On Haghier hills.—*B.C.S., Schweinf., Benth.*

Plectranthus, L'Her.**422. * *Plectranthus*, sp.**

Limestone plateaux (over 1500 ft.).—*B.C.S., Schweinf.*

Some fragments of this were in one of the Wardian cases from Sokotra, but did not survive.

Lavandula, Linn.**423. † *Lavandula Nimmoi*, Benth.**

On plains and hills.—*B.C.S., Schweinf., Hunter, Nimmo.*

Micromeria, Benth.**424. *Micromeria microphylla*, Benth.**

Abundant. — *B.C.S., Schweinf.*

425. *Micromeria microphylla*, Benth., var. *remota*, Balf. fil.

B.C.S., Schweinf.

426. *Micromeria microphylla*, Benth., var. *imbricata*, Balf. fil.**Leucas, R. Br.****427. *Leucas* (Hemistoma) *urticæfolia*, R. Br.**

Near Galonsir, Hadibu, and elsewhere.—*B.C.S., Schweinf.*

428. *Leucas* (Loxostoma) *Neuflyzeana*, Courb.

Hadibu.—*Schweinf.*

429. *Leucas* (Ortholeucas) *lanata*, Benth.

Haghier hills. — *B.C.S., Schweinf., Benth.*

430. † * **Leucas** (*Ortholencas*) **virgata**, *Balf. fil.*

Everywhere.—*B.C.S.*, *Schweinf.*, *H.O.F.*

Lasiocarys, *Benth.*

431. † **Lasiocarys** **spiculifolia**, *Balf. fil.*, *Op. cit.* Tab. LXXXI, A.

On the plains.—*B.C.S.*, *Bent.*

432. † **Lasiocarys** **flagellifera**, *Balf. fil.*, *Op. cit.* Tab. LXXXI, B.

Limestone cliffs south-west of Galonsir.—*B.C.S.*

Teucrium, *Linn.*

433. † **Teucrium** (*Polium*) **prostratum**, *Balf. fil.*

Base of limestone cliffs near Galonsir : near Hadibu.—*B.C.S.*, *Hunter.*

434. † * **Teucrium** (*Polium*) **petiolare**, *Balf. fil.*

Adho Dimellus (No. 211).—*H.O.F.*

Hills south of Galonsir and on Haghier.—*B.C.S.*, *Schweinf.*

435. † **Teucrium** (*Polium*) **petiolare**, var. **pubescens**, *Balf. fil.*

Haghier hills (3000 ft.).—*Schweinf.*

PLANTAGINEÆ.

Plantago, *Linn.*

436. * **Plantago** **amplexicaulis**, *Car.*

Garieh plains.—*H.O.F.*

Abundant on the plains.—*B.C.S.*

Genus Anomalum.

Wellstedia, *Balf. fil.*

437. † **Wellstedia** **socotrana**, *Balf. fil.*, *Op. cit.* Tab. LXXXII, A.

B.C.S., *Hunter.*

MONOCHLAMYDEÆ.

NYCTAGINEÆ.

Boerhaavia, *Linn.*

438. **Boerhaavia** **repens**, *Linn.*

On plains.—*B.C.S.*

439. **Boerhaavia** **diffusa**, *Linn.*

Hill slopes.—*B.C.S.*, *Schweinf.*

440. * **Boerhaavia** **scandens**, *Linn.*

Seeds probably of this species collected.—*H.O.F.*

Common.—*B.C.S.*, *Bent.*

ILLECEBRACEÆ.**Haya**, *Balf. fil.*

441. † * **Haya obovata**, *Balf. fil.*, Op. cit. Tab. LXXXIII.
 Adho Dimellus (No. 193).—*H.O.F.*
 Hill slopes.—*B.C.S.*, *Schweinf.*

Lochia, *Balf. fil.*

442. † **Lochia bracteata**, *Balf. fil.*, Op. cit. Tab. LXXXIV.
 Slopes of Haghier.—*B.C.S.*

AMARANTACEÆ.**Digera**, *Forsk.*

443. **Digera arvensis**, *Forsk.*
 Hadibu.—*Schweinf.*, *Bent.*

Amarantus, *Linn.*

444. * **Amarantus** (Euxolus) **Blitum**, *Linn.*
 Common.—*B.C.S.*

445. **Amarantus** (Euxolus) **polygamus**, *Linn.*
 Occasional.—*B.C.S.*, *Schweinf.*

Pupalia, *Juss.*

446. **Pupalia lappacea**, *Juss.*
 Plains at Galonsir.—*B.C.S.*

Psilostachys, *Hochst.*

447. **Psilostachys sericea**, *Benth.*
 Near Galonsir and Hadibu.—*B.C.S.*, *Schweinf.*

Ærua, *Forsk.*

448. * **Ærua javanica**, *Juss.*
 Hadibu Plain (No. 98).—*H.O.F.*
 Common.—*B.C.S.*

449. † **Ærua microphylla**, *Moq.* Balf. fil., Op. cit. Tab. LXXXV.
 Plains about Galonsir.—*B.C.S.*, *Schweinf.*, *Bent.*, *Nimmo.*

450. **Ærua lanata**, *Juss.*

Near Galonsir and elsewhere.—*B.C.S.*, *Schweinf.*, *Hunter.*

451. **Ærua lanata**, *Juss.*, var. **robusta**, *Balf. fil.*
 Plains near Galonsir.—*B.C.S.*, *Schweinf.*

452. † * *Ærua revoluta*, *Balf. fil.*

Jena-agahan (1500-2000 ft., 3. I. 99, No. 150).—*H.O.F.*

On the Haghier range at considerable elevation.—*B.C.S.*, *Schweinf.*, *Bent.*

Achyranthes, *Linn.*453. *Achyranthes aspera*, *Linn.*

Common.—*B.C.S.*, *Bent.*

454. *Achyranthes aspera*, *Linn.*, var. *sicula*, *Linn.*

On plains.—*B.C.S.*, *Bent.*

CHENOPODIACEÆ.**Chenopodium**, *Linn.*455. *Chenopodium murale*, *Linn.*

Near Galonsir.—*B.C.S.*

Atriplex, *Linn.*456. *Atriplex Stocksii*, *Boiss.*

Near Khor Hadjin, Khadup Plain.—*B.C.S.*

Suæda, *Forsk.*457. *Suæda monoica*, *Forsk.*

Common.—*B.C.S.*

POLYGONACEÆ.**Polygonum**, *Linn.*458. * *Polygonum* (*Persicaria*) *glabrum*, *Willd.*

H.O.F., *B.C.S.*

459. *Polygonum* (*Persicaria*) *barbatum*, *Linn.*

B.C.S.

ARISTOLOCHIACEÆ.**Aristolochia**, *Linn.*460. * *Aristolochia*, *sp.*

Found in flower (3. II. 99), on granite slopes in a rock-crevice above our camp at Adho Dimellus. The roots, which are narrow, watery, and white in colour, are eaten by the hill people. The roots were brought to us also while at Homhil, but without flower or foliage. The herbarium specimen appears to have unfortunately been lost.—*H.O.F.*

On cliffs south-west of Galonsir.—*B.C.S.*

PIPERACEÆ.**Peperomia**, *Ruiz et Pav.*461. *Peperomia arabica*, *Dene.*

Haghier hills.—*B.C.S.*, *Schweinf.*

462. *Peperomia reflexa*, A. Dietr., var. *parvifolia*, Cas. DC.Occasional.—*B.C.S.*, *Schweinf.***463. *Peperomia Goudotii*, Miq.**Haghier range.—*B.C.S.*, *Schweinf.***THYMELÆACEÆ.*****Lasiosiphon*, Fresen.****464. † * *Lasiosiphon socotranus*, Balf. fil., Op. cit. Tab. LXXXVI.**Adho Dimellus (Nos. 177, 189, 216).—*H.O.F.*A not uncommon shrub.—*B.C.S.*, *Schweinf.*, *Bent*, *Hunter*.

A charming plant, seeds of which have, however, not yet germinated.

LORANTHACEÆ.***Loranthus*, Linn.****465. *Loranthus*, *sp.***Near Galonsir.—*B.C.S.***SANTALACEÆ.*****Osyris*, Linn.****466. *Osyris arborea*, Wall.**On Haghier range (over 1500 ft.).—*B.C.S.*, *Schweinf.***467. † * *Osyris pendula*, Balf. fil., Op. cit. Tab. LXXXVII.**Seen growing, out of reach, on top of a high cliff on the limestone hills to the south-west of Hadibu.—*H.O.F.*On the Haghier hills.—*B.C.S.****Thesidium*, Sond.****468. *Thesidium*, *sp.* ?**Khadup plain.—*B.C.S.***EUPHORBIACEÆ.**

Seeds of several Euphorbiaceæ plants have germinated in the Royal Botanic Garden, but it is too soon yet to identify the species in all cases with certainty.

Euphorbia*, Linn.*469. * *Euphorbia* (*Anisophyllum*) *indica*, Lamk.**Hadibu Plain.—*H.O.F.*Near Galonsir and Hadibu.—*B.C.S.*, *Schweinf.***470. * *Euphorbia* (*Anisophyllum*) *Chamaesyce*, Linn.**Adho Dimellus. Plant gathered (2. II. 98).—*H.O.F.*Many places.—*B.C.S.*, *Schweinf.*, *Bent*.

471. † **Euphorbia** (*Anisophyllum*) **leptoclada**, *Balf. fil.*
Above Kischen (over 2700 ft.).—*Schweinf.*
472. † * **Euphorbia** (*Eremophyton*) **socotrana**, *Balf. fil.*, Op. cit. Tab. LXXXVIII.
On Hamaderu, a limestone hill above our camp at Homhil (at 2500 ft., No. 183).—*H.O.F.*
On slopes of hills on both sides of island.—*B.C.S.*, *Schweinf.*, *Hunter.*
473. † **Euphorbia** (*Tirucalli*) **obcordata**, *Balf. fil.*
Rocky places near Galonsir.—*B.C.S.*
474. † **Euphorbia** (*Tirucalli*) **Schweinfurthii**, *Balf. fil.*
Above Kischen (over 2500 ft.).—*Schweinf.*, *Bent.*
475. † **Euphorbia** (*Tirucalli*) **oblanceolata**, *Balf. fil.*
Haghier hills south from Hadibu.—*B.C.S.*
476. * **Euphorbia** (*Tirucalli*) **Schimperi**, *Presl.*
On the slopes of Aduna (500-1500 ft., 21. XII. 98, No. 134).—*H.O.F.*
Common about Galonsir, Hadibu and elsewhere.—*B.C.S.*, *Schweinf.*, *Hunter.*
477. † * **Euphorbia** (*Tirucalli*) **arbuscula**, *Balf. fil.*, Op. cit. Tab. LXXXIX.
Collected near Homhil.—*H.O.F.*
Abundant.—*B.C.S.*, *Schweinf.*, *Bent.*
A plant of this species came home safely in a Wardian case and is now growing in the Royal Botanic Garden, Edinburgh.
478. † **Euphorbia** **arbuscula**, var. **montana**, *Balf. fil.*
On the hills.—*B.C.S.*, *Schweinf.*
479. † * **Euphorbia** (*Diacanthium*) **spiralis**, *Balf. fil.*
Collected on Gebel Bitzobur (14. I. 99): and at Homhil (22. I. 99).—*H.O.F.*
On the plains: not infrequent.—*B.C.S.*
We have a couple of plants of this species alive in the Royal Botanic Garden, Edinburgh. They came home in a Wardian case.

Buxus, *Linn.*

- 480 * **Buxus** **Hildebrandtii**, *Baill.*
This species grew in great abundance at Homhil, forming large shrub-beries; towards the summit of Dimimi it was also abundant, and here ripe seed was gathered (8. I. 98) in quantity (No 204).—*H.O.F.*
Many seedlings of this are in the Royal Botanic Garden.
Abundant.—*B.C.S.*, *Schweinf.*, *Hunter.*

Phyllanthus, *Linn.*

481. **Phyllanthus** (*Paraphyllanthus*) **maderaspatensis**, *Linn.*
Near Galonsir.—*B.C.S.*, *Schweinf.*

482. *Phyllanthus rotundifolius*, Willd., var. *leucocalyx*, Mull. Arg.Near Galonsir.—*B.C.S.***483. † *Phyllanthus* (*Euphyllanthus*) *filipes*, Balf. fil.**On the plains.—*B.C.S.*, *Schweinf.****Securinega*.****484. † *Securinega Schweinfurthii*, Balf. fil.**Above Wady Digal (over 1500 ft.).—*Schweinf.****Flüggea*, Willd.****485. *Flüggea microcarpa*, Blume.**Common.—*B.C.S.*, *Schweinf.*, *Bent?***486. *Flüggea Leucopyrus*, Willd.**Near Galonsir.—*B.C.S.****Jatropha*, Linn.****487. † * *Jatropha* (*Adenoropium*) *unicostata*, Balf. fil., Op. cit. Tab. XC.**Growing abundantly on Hadibu Plain, but only at the base of the limestone hills. It was absent from the granite-sand covered parts of the plain. Seeds were collected and brought home.—*H.O.F.*

There are several healthy young plants of this in the Royal Botanic Garden, Edinburgh.

Abundant.—*B.C.S.*, *Schweinf.*, *Bent*, *Perry*, *Hunter*.***Croton*, Linn.****488. † *Croton* (*Eluteria*) *sarocarpus*, Balf. fil., Op. cit. Tab. XCI.**Many places on hill slopes.—*B.C.S.*, *Schweinf.***489. † *Croton* (*Eluteria*) *sulcifructus*, Balf. fil., Op. cit. Tab. XCII.**On Haghier hills.—*B.C.S.*, *Schweinf.*, *Hunter*.**490. † *Croton* (*Eluteria*) *elæagnoides*, Balf. fil.**On Haghier hills.—*B.C.S.***491. † * *Croton* (*Eluteria*) *socotranus*, Balf. fil., Op. cit. Tab. XCIII.**Garieh Plain.—*H.O.F.*Plains and lower slopes of hills.—*B.C.S.*, *Schweinf.*, *Bent*.***Chrozophora*, Neck.****492. *Chrozophora tinctoria*, Ad. Juss.**Near Galonsir.—*B.C.S.***493. *Chrozophora obliqua*, Ad. Juss.**Near Galonsir, and Hadibu.—*B.C.S.*

494. Chrozophora obliqua, *Ad. Juss.*, var. **frutescens**, *Schweinf.*

Near Hadibu.—*Schweinf.*

Cephalocroton, *Hochst.***495. † * Cephalocroton socotranus**, *Balf. fil.*, Op. cit. Tab. XCIV.

Top of Hamaderu, a limestone hill above our camp at Homhil (No. 164).
—*H.O.F.*

Many places, both on great altitudes and on the shore plains.—*B.C.S.*,
Schweinf., *Bent.*

Acalypha, *Linn.***496. * Acalypha indica**, *Linn.*

Near villages.—*B.C.S.*, *Schweinf.*, *H.O.F.*

Ricinus.**497. * Ricinus communis**, *Linn.*

Near villages in Garich Plain.—*H.O.F.*

Near Galonsir.—*B.C.S.*

Tragia, *Linn.***498. † * Tragia** (*Tagira*) **dioica**, *Balf. fil.*

Adho Dimellus (No. 227). Kamahanu, Gebel Bitzobur, and elsewhere ;
very abundant.—*H.O.F.*

Common on slopes of Haghier.—*B.C.S.*, *Schweinf.*, *Bent.*

URTICACEÆ.**Dorstenia**, *Linn.***499. † * Dorstenia gigas**, *Schweinf.*

On the limestone hills above our camp at Homhil, growing in crevices of
the rocks and assuming extraordinary forms ; on the top of Gebel
Homhil (3500 ft.).—*H.O.F.*

In crevices and rocky places on the hills.—*B.C.S.*, *Schweinf.*, *Wellsted.*

Several plants of this, brought home in a Wardian case, are now alive in
the Royal Botanic Garden, Edinburgh.

Ficus, *Linn.***500. † * Ficus** (*Urostigma*) **socotrana**, *Balf. fil.*

On the slopes of Aduna (400-1500 ft., 21. XII. 98, No. 109). On the
Homhil plateau. Native name Täek.—*H.O.F.*

Abundant.—*B.C.S.*, *Schweinf.*

501. * Ficus (*Urostigma*) **salicifolia**, *Vahl.*

Hadibu Plain (Nos. 99, 187). Largely fed upon by the Starlings
(*Amydrus blythi*).—*H.O.F.*

Spread over the island.—*B.C.S.*, *Schweinf.*

502. Ficus, *sp.*

B.C.S.

Pouzolzia, Gaud.**503. Pouzolzia auriculata, Wight.**

On the hills.—*B.C.S., Schweinf.*

Forskohlea, Linn.**504. Forskohlea viridis, Desf.**

Common.—*B.C.S., Schweinf.*

Australina, Gaud.**505. Australina capensis, Wedd.**

On hill slopes.—*B.C.S.*

MONOCOTYLEDONES.

HYDROCHARIDÆ.**Largarosiphon, Harv.****506. Largarosiphon Roxburghii, Benth.**

In river pools.—*Boivin.*

ORCHIDÆ.**Habenaria, Willd.****507. † * Habenaria socotrana, Balf. fil., Op. cit. Tab. LXXXII, B.**

On the slopes of Aduna.—*H.O.F.*

Hills near Galonsir.—*B.C.S., Nimmo.*

Tubers of this small flowered species have flowered in the Royal Botanic Garden, Edinburgh.

Angræcum.**508. Angræcum dives, Rolfe?**

An epiphytic species, found both by Mr. Ogilvie-Grant and Dr. Forbes to the south of Adho Dimellus, was brought home alive, and has flowered in the Royal Botanic Garden. Mr. Rolfe thinks it is possibly this species, but the leaves are only one-fourth as large as those of the type which is a plant of Kilimanjaro and Mombasa.

Holothrix, L. C. Rich.**509. † * Holothrix socotrana, Rolfe, sp. nov.**

Adho Dimellus (No. 210).—*H.O.F.*

Folia radicalia 2 sessilia, ovata, acuta, villosa, 1-1 $\frac{1}{4}$ poll. longa, 9-11 lin. lata. Scapus erectus, dense pilosus; spica brevis, multiflora. Bracteae lanceolatae, acuminatae, pilosae. Sepala ovato-oblonga, subobtusula.

Petala lineari-oblonga, subobtusata, integra. Labellum profunde trifidum, lobis lineari-oblongis, subobtusis; calcar conico brevi. Columna brevis.

Allied to the Abyssinian *H. Richardii*, Rolfe. This specimen is rather imperfect, and the flowers still in the bud state, but the extension of this essentially African genus into Sokotra is so interesting that I have ventured to describe it, omitting, however, the dimensions of the flower, which might have been misleading. In the specimen the sepals are a line long.—*R. A. Rolfe*.

I am indebted to Mr. Rolfe, of Kew, for the description of this species.

IRIDEÆ.

Romulea, *Maratti*.

510. † * *Romulea purpurascens*, *Tenore*, var. *edulis*, *Baker*.

On the slopes of Aduna (21. XII. 98, 2000 ft., No. 130). Homhil (3000 ft., No. 168). The tubers were gathered largely here for food. This species occurs also in Abd-el-Kuri.—*H.O.F.*

Haghier hills (over 3000 ft.).—*Schweinf.*, *Ninmo*, *Bent*, *Wellsted*.

Plants of this species are now growing well in the Royal Botanic Garden, Edinburgh.

Babiana, *Ker*.

511. † * *Babiana socotrana*, *Hook fil.* Bot. Mag. Tab. 6585.

On limestone slopes above our Homhil camp (at about 1700 ft.). Also in the sparse soil on ledges of the granite rocks in the Haghier hills (at 3000 ft.), in association with *Ecacum ceruleum*, *E. Forbesii*, *Begonia socotrana*, &c.—*H.O.F.*

On the hill slopes south-west from Galonsir.—*B.C.S.*

Tubers of this interesting plant have flowered in the Royal Botanic Garden, Edinburgh.

AMARYLLIDEÆ.

Crinum, *Linn*.

512. † * *Crinum Balfourii*, *Baker*. Bot. Mag. Tab. 6570.

On the limestone slopes of Hamaderu above our camp at Homhil (1700 ft.), the bulbs growing sometimes in enormous clumps weighing over a hundredweight. Native name "Difataha."—*H.O.F.*

On the high plains (at an elevation over 1500 ft.), south-west from Galonsir.—*B.C.S.*

A splendid series of bulbs of this beautiful sweet-scented plant (collected by Forbes) were brought home, and some of them flowered within a month of their arrival in the Royal Botanic Garden, Edinburgh. It is a species which, as has been before now pointed out, should be of value in horticulture, not only for its individual merits, but for crossing for its perfume.

Hæmanthus, *Linn.***513. † * Hæmanthus grandifolius**, *Balf. fil.*

On the limestone slopes to the south-west of Hadibu ; on the slopes below Adma (2000 ft.) ; also on the higher parts (1800-2000 ft.) of both Hamaderu and Matagoti, above our camp at Homhil, this species was abundant. A number of tubers, of what is believed to be this plant, were brought home. The plant was not seen in flower, but its two (and occasionally three) large broad leaves render it conspicuous and unmistakeable. — *H.O.F.*

The stream banks of the slopes of Haghier, south from Hadibu. — *B.C.S.*

These tubers are still alive, but they have not yet thrown up any leaves or flower stalks (VIII. 02).

DIOSCOREACEÆ.**Dioscorea**, *Linn.***514. † * Dioscorea lanata**, *Balf. fil.*

On the hills above our camp at Homhil. They were being constantly hunted for by the natives for food. — *H.O.F.*

Has flowered in the Royal Botanic Garden, Edinburgh.

On Haghier. — *B.C.S.*, *Schweinf.*, *Nimmo*.

LILIACEÆ.**Asparagus**, *Linn.***515. † * Asparagus africanus**, *Link.*, var. **microcarpus**, *Balf. fil.*

On the plains. — *B.C.S.*, *Schweinf.*, *H.O.F.*

Aloe, *Linn.***516. † * Aloe Perryi**, *Baker*. Bot. Mag. Tab. 6596.

Adho Dimellus (4000 ft., II. 99, Nos. 198, 219). — *H.O.F.*

Various parts of the island. — *B.C.S.*, *Schweinf.*, *Bent*, *Perry*, *Collins*, *Wellsted*.

Several plants of this species were brought home by the expedition in a Wardian case, and are now growing well in the Royal Botanic Garden, Edinburgh.

[Mr. Holmes sends me the following report upon specimens of aloes brought by the expedition and submitted to him :—

“Three specimens of Socotrine aloes were received, viz. :

1. Solid, in an earthenware vessel.
2. Liquid, in a large bottle.*
3. Liquid, in a small bottle.

* The liquid aloes in bottles Nos. 2 and 3 belongs to the same collection. That in the small bottle had stood for some time, and had thus, by evaporation, become slightly more concentrated. — *H.O.F.*

No. 1 represents aloes such as would be considered in English commerce of second-class quality, being blackish and giving a dull brown powder and opaque splinter when broken.

No. 2, when evaporated, gave a brownish transparent aloes, yielding a brownish yellow powder of a pleasant odour, and would be classed in commerce as first-class Sokotrine aloes.

No. 3 presents the same appearance, and gives a similar powder to No. 2. The specimens have been examined chemically at my request by my friend, W. A. H. Naylor, F.I.C., in the laboratory of Messrs. Hearon Squire & Francis, with the following results :—

	Large Bottle.	Small Bottle.
Water, - - - - -	56·454	50·012
Resin, - - - - -	22·432	29·854
Alcin, - - - - -	4·586	9·563
Extraneous organic matter, - -	13·730	8·570
Extraneous inorganic matter (ash), -	2·798	2·001
	<hr/> 100·000	<hr/> 100·000
Total solids when evaporated, - -	43·546	49·988
Alcin percentage in the dried liquid,	10·531	19·130

It may here be mentioned that the aloes produced from the leaves of *Aloe Perryi*, Baker, is the only kind known which does not give a crimson coloration with strong nitric acid when the latter is dropped upon the powdered aloes.

The fact that No. 3 contains a larger percentage of alcin is probably due to the fact that the bottle No. 2 contained the upper stratum of liquid aloes, that bottle being first filled, whilst No. 3 was filled with the lower stratum of the same liquid. When aloes juice is allowed to settle a considerable portion separates and falls to the bottom of the vessel, forming a yellowish deposit at the bottom of a dark brown liquid.

Sokotrine aloes is usually imported into this country in kegs. The aloes is of a treacly or pasty consistence, and varies in colour and odour, according to the care exercised in its preparation and conservation. The parcels imported of late years have been very inferior in quality, and a really good Sokotrine aloes has long been a desideratum in the market. The best Sokotrine aloes, now rarely seen in commerce, has a garnet colour, translucent fragments, and a somewhat fragrant odour. The wholesale price for the best Sokotrine aloes obtainable in commerce is at present about 4s. 6d. per lb. But it must be remembered that 1 lb. of aloes juice as imported will only yield about $\frac{3}{4}$ lb. of dried aloes, so that the price obtained by the exporter at drug auctions is considerably less, varying from about 80s. to 90s. per cwt. Another variety presenting the characters of Sokotrine aloes in odour and chemical test (i.e., giving a reddish brown, but not crimson, colour

when a little of the powdered drug is touched with strong nitric acid) is sold under the name of Zanzibar aloes. This is usually solid, opaque, brownish, and is packed in goats' skins. A spurious kind imported in tins, or tin-lined cases, is also sold as Sokotrine aloes. This has a different odour, and gives a crimson colour when the powder is tested with nitric acid. It will be understood therefore that there is a demand for genuine Sokotrine aloes of good quality, i.e., carefully prepared as it would be done by Europeans. Such a drug would probably fetch 95s. to 100s. per cwt, according to the quantity in the market at the time or the scarcity of the drug. An account of the preparation of aloes in Sokotra is given in the *Botany of Sokotra*, Introductory Chapter, p. xxxviii., by Professor I. B. Balfour.—*H.O.F.*]

517. † * ***Aloe squarrosa***, *Baker*.

What I believe to be this species, the leaves being distinctly white, was observed on Gebel Bitzobur, a limestone hill in the Garieh Plain (about 800 ft.); and on the slopes of Ferah, or Gebel Dryat as it is also called, the highest peak of the Haghier (at about 4200 ft.), one of which I attempted to bring home alive in a Wardian case.—*H.O.F.*

Base of the limestone cliffs, south-west of Galonsir.—*B.C.S.*

518. † * ***Aloe Forbesii***, *Balf. fil., sp. nov.* (Plate xxvi B.)

H.O.F.

Caulis brevis subsarmentosus internodiis $\frac{1}{8}$ – $\frac{1}{4}$ poll. longis. Folia 5-6 patula late amplexicaulia linearia acuminata 4-6 poll. longa, $\frac{1}{2}$ poll. lata, medio $\frac{1}{4}$ poll. crassa, glaucoviridia immaculata hand lineata, facie a basi canaliculata ad apicem teretia, dentibus marginalibus plus minusve evolutis interdum in plantis junioribus nullis deltoideis minutis $3\frac{1}{2}$ poll. longis rectis albidis cartilagineis. Inflorescentia simplex 8-9 poll. longa, pedunculo communi deorsum applanato glauco bracteas 4-5 steriles gerente. Racemus cylindricus laxiflorus pauciflorus 2 poll. longus, pedicellis $\frac{1}{2}$ poll. longis rubris, bracteis deltoideo-acuminatis minutis $\frac{3}{16}$ poll. longis pedicellis brevioribus membranaceis pulvino basali instructis. Perianthium trigono-cylindricum rubro-luteum $\frac{3}{4}$ poll. longum, tubo supra ovarium leviter constrictum, limbi lobis oblongis $\frac{1}{4}$ poll. longis linea media viridula tinctis. Petala sepalis dorsaliter annexa lateribusque intra perianthii tubum liberis. Stamina antisejala breviora inclusa filamentis applanatis, antipetala longiora breviterque exserta filamentis teretibus. Stylus staminibus longioribus aequilongus.

Sokotra.

Along with the living specimens of *Aloe Perryi* brought home by the expedition were young plants of two other species. One of these has now flowered in the Royal Botanic Garden, Edinburgh, and this hitherto undescribed species I here name. It is easily distinguished from *Aloe Perryi* and *Aloe squarrosa*, the other Sokotran species; from the former by its thin not erect stem, narrow leaves, and simple

inflorescence with smaller flowers; from the latter by its unspotted narrow leaves. The plant is a neat one resembling, when young, in which condition the leaves are often spineless, some of the *Mesembryanthemums*. The inflorescence is a small one with too few and small flowers to be striking as a horticultural plant.

Dracæna, *Vandel.*

519. † * **Dracæna Cinnabari**, *Balf. fil.*, Op. cit. Tabl. XCVI, XCVII.

Found this species in flower and fruit, on 26. I. 99, on Hamaderu (at 2500 ft.), above our camp at Homhil. This was the only tree seen in flower during our stay—December '98 to February '99. (No. 165.) Native name given to us by the Adho Dimellus natives, "Arhiel."
—*H.O.F.*

Several plants of this species came home alive in a Wardian case, and we have an abundant supply of seedlings, from fruit collected by the expedition, in the Royal Botanic Garden, Edinburgh.

Common.—*B.C.S.*, *Schweinf.*, *Perry*, *Wellsted*.

Asphodelus, *Linn.*

520. * **Asphodelus fistulosus**, *Linn.*, var. **tenuifolius**, *Baker*, Bot. Mag. t. 984.

On the hill slopes near Galonsir.—*B.C.S.*

Jena-agahan (1500-2000 ft., 3. I. 99, No. 151).—*H.O.F.*

Scilla, *Linn.*

521. * **Scilla indica**, *Baker*.

H.O.F.

Amongst the bulbs brought home are some which, on flowering in the Royal Botanic Garden, have turned out to belong to this species. This is an interesting addition to the Sokotran Flora. The plant is one of the Deccan Peninsula and Central India, and is known also from Abyssinia. The Sokotran habitat thus connects these extremes.

Anthericum, *Linn.*

522. † **Anthericum** (Phalangium) **graptophyllum**, *Baker*.

Hills in several places.—*B.C.S.*, *Schweinf.*

Dipcadi, *Medicus.*

523. † * **Dipcadi** (*Tricharis*) **Balfourii**, *Baker*.

Some of these tubers have flowered in the Royal Botanic Garden, Edinburgh.

A few tubers of this species were collected on the limestone slopes above our camp at Homhil.—*H.O.F.*

B.C.S.

Urginea, Steinh.**524. † Urginea porphyrostachys, Baker.**

Near Kischen (over 3000 ft.).—*Schweinf.*

AROIDEÆ.**Remusatia, Schott.****525. * Remusatia vivipara, Schott.**

An abundant supply of tubers of this species was brought home, and are now growing well in the Royal Botanic Garden. One or two flowered shortly after their arrival, and we were thus able to determine the species.

This adds another to the list of Sokotran species with an otherwise only Eastern Asiatic distribution. Several aroids are useful economic plants, but I cannot find that this species has any such value, and it is not therefore likely to have been purposely introduced into Sokotra; but the spiny shoots might, as Sir George King suggests, facilitate its accidental introduction in the considerable intercourse between India and the island in the early portion of this century.

Adho Dimellus. In swampy places in the valleys north and south of our camp (No. 202).—*H.O.F.*

COMMELINACEÆ.**Commelina, Linn.****526. * Commelina benghalensis, Linn.**

Many localities.—*B.C.S., Schweinf.*

Observed on the hills above Hadibu; also on Hamaderu above our camp at Homhil, on the limestone. Also on the slopes of Aduna.—*H.O.F.*

527. Commelina (Heterocarpus) Forskalæi, Vahl.

About Galonsir and Hadibu, and other places.—*B.C.S., Schweinf.*

528. Commelina (Heteropyxis) albescens, Hassk.

Near Galonsir and Hadibu.—*B.C.S., Schweinf.*

Cyanotis, Don.**529. * Cyanotis cristata, Rœm. & Schult.**

Near Hadibu.—*B.C.S.*

On Hadibu Plain; slopes of Aduna, near our camp at Dahamis (21. XII. 98).—*H.O.F.*

JUNCACEÆ.**Juncus, Linn.****530. * Juncus maritimus, Lamk.**

About Galonsir and elsewhere.—*B.C.S., Schweinf.*

Near Khor Garieh.—*H.O.F.*

PALMÆ.**Phœnix, Linn.****531. * Phœnix dactylifera, Linn.**

On banks of streams in Hadibu Plain, and in the ravines of the Goahal Gorge, and generally.—*B.C.S., Schweinf., H.O.F.*

Borassus, Linn.**532. * Borassus flabelliformis, Linn.**

Occasional.—*B.C.S.*

Seen in the Date-palm groves in Hadibu and Garieh Plains.—*H.O.F.*

NAIADACEÆ.**Potamogeton, Linn.****533. Potamogeton natans, Linn., subsp. plantagineus, Du Croz.**
*B.C.S.***534. Potamogeton fluitans, Roth.**
*B.C.S.***535. Potamogeton pectinatus, Linn.**
In streams.—*B.C.S.***Ruppia, Linn.****536. Ruppia maritima, Linn.**
Streams near Galonsir.—*B.C.S.***Naias, Linn.****537. Naias major, All.**
Streams near Galonsir.—*B.C.S., Schweinf.***538. * Naias (Caulinia) graminea, Delile.**
In streams near Garieh.—*B.C.S.*
In the Nesharhir river, under Gebel Bitzobur.—*H.O.F.***CYPERACEÆ.****Cyperus, Linn.****539. Cyperus (Pycneus) pumilus, Linn., var. patens, Benth.**
On Haghier hills. Not common.—*B.C.S., Schweinf.***540. Cyperus (Juncellus) lævigatus, Linn.**
About Galonsir, abundant.—*B.C.S., Schweinf.***541. * Cyperus amabilis, Vahl.**
Near Aduna, on the Haghier hills (at a high altitude).—*B.C.S.*
On the slopes of Aduna, above our camp at Dahamis.—*H.O.F.*

542. * *Cyperus aristatus*, Rottb.Near Hadibu.—*B.C.S.*Jena-agahan (1800 ft., I. 99, No. 146).—*H.O.F.***543. *Cyperus rubicundus*, Vahl.**Near Galonsir.—*B.C.S.***544. *Cyperus compressus*, Linn.**On Haghier hills south from Hadibu.—*B.C.S.***545. *Cyperus proteinolepis*, Bekl.**Near Galonsir.—*B.C.S.***546. *Cyperus proteinolepis*, var. *major*, Balf. fil.***Nimmo.***547. † *Cyperus conglomeratus*, Rottb., var. *socotranus*, Balf. fil.**Near Galonsir.—*B.C.S.***548. *Cyperus difformis*, Linn.**Near Hadibu.—*B.C.S.***549. *Cyperus* (Papyrus) *Tegetum*, Rorb.**Near Galonsir.—*B.C.S.***550. *Cyperus* (Papyrus) *tenuiflorus*, Rottb.**On the banks of the stream at Katheng.—*Schweinf.***551. *Cyperus* (Papyrus) *rotundus*, Linn.**Near Galonsir.—*B.C.S.*, *Schweinf.***552. *Cyperus* (Mariscus) *umbellatus*, Benth., var. *cyperinus*, Balf. fil.**Near Hadibu.—*B.C.S.***553. * *Cyperus Teneriffæ*, Poir.**

Not previously recorded from Sokotra.

Jena-agahan (1800 ft., I. 99, No. 152).—*H.O.F.****Kyllinga*, Rottb.****554. *Kyllinga brevifolia*, Rottb.**Common.—*B.C.S.*, *Schweinf.****Heleocharis*, R. Br.****555. *Heleocharis* (Heleogenus) *albovaginata*, Bekl., var. *humilis*, Bceck.**Near Hadibu.—*B.C.S.***556. * *Heleocharis* (Heleogenus) *capitata*, R. Br.**Abundant on sandy banks of streams.—*B.C.S.*, *Schweinf.*By the stream running into Khor Garieh.—*H.O.F.*

Fimbristylis, Vahl.

557. **Fimbristylis** (*Dichelostylis*) **diphylla**, *Vahl.*

Haghier hills at various altitudes.—*B.C.S., Schweinf.*

558. **Fimbristylis** (*Dichelostylis*) **ferruginea**, *Vahl.*

Common.—*B.C.S., Schweinf.*

559. **Fimbristylis** (*Trichelostylis*) **hispidula**, *Kunth.*

At Galonsir and Hadibn.—*B.C.S.*

560. **Fimbristylis** (*Trichelostylis*) **autumnalis**, *Ram. et Schult.*

Haghier hills.—*B.C.S.*

561. **Fimbristylis** (*Trichelostylis*) **glomerata**, *Nees ab Essenh.*

Abundant.—*B.C.S., Schweinf.*

Fuirena, Rottb.

562. **Fuirena glomerata**, *Lamk.*

On Haghier.—*B.C.S.*

Cladium, P. Br.

563. **Cladium mariscus**, *P. Br.*

Near Hadibn.—*B.C.S., Schweinf.*

GRAMINEÆ.**Paspalum, Linn.**

564. **Paspalum scrobiculatum**, *Linn.*

Near Galonsir.—*B.C.S.*

565. **Paspalum distichum**, *Linn.*

Galonsir.—*B.C.S., Schweinf.*

Eriochloa, H. B. & K.

566. † **Eriochloa vestita**, *Bolf. fil.*

Limestone plains south-west of Galonsir (at over 1500 ft.).—*B.C.S.*

Panicum, Linn.

567. * **Panicum** (*Digitaria*) **sanguinale**, *Linn.*

Common.—*B.C.S.*

Aduna slopes (400-1500 ft., No. 108, 21. XII. 98).—*H.O.F.*

568. * **Panicum Teneriffæ**, *R. Br.*

This is an addition to the Sokotran flora.

Aduna slopes (400-1500 ft., No. 108, 21. XII. 98).—*H.O.F.*

569. **Panicum** (*Brachiaria*) **paspaloides**, *Pers.*

Near Galonsir and elsewhere.—*B.C.S., Schweinf.*

570. *Panicum* (Brachiaria) *eruciforme*, Sibth.Near Hadibu.—*B.C.S.***571. *Panicum* (Echinochloa) *colonum*, Linn.**Abundant.—*B.C.S.***572. *Panicum* *turgidum*, Forsk.**Abundant near Galonsir.—*B.C.S.*, *Schweinf.***573. *Panicum* *Petiveri*, Trin.**Very common.—*B.C.S.*, *Schweinf.***574. *Panicum* *nudiglume*, Hochst.**Wadi Digal ; Kischen.—*Schweinf.***575. *Panicum* *nudiglume*, Hochst, var. *major*, Hochst.**Near Galonsir.—*B.C.S.***576. *Panicum* *atrosanguineum*, Hochst.**Haghier hills.—*B.C.S.*, *Schweinf.***577. † *Panicum* *ridigum*, Balf. fil.**Galonsir, Hadibu and elsewhere.—*B.C.S.*, *Schweinf.****Oplismenus*, Beauv.****578. *Oplismenus* *Burmanni*, Beauv.**Common.—*B.C.S.*, *Schweinf.***579. *Oplismenus* *compositus*, Beauv.**Wadi Digal.—*Schweinf.****Setaria*, Beauv.****580. *Setaria* *glauca*, Beauv.**Abundant.—*B.C.S.***581. *Setaria* *viridis*, Beauv.**Not uncommon.—*B.C.S.***582. * *Setaria* *verticellata*, Beauv.**Near Galonsir.—*B.C.S.*Aduna slopes (400-1500 ft., No. 144, 21. XII. 98).—*H.O.F.****Cenchrus*, Linn.****583. *Cenchrus* *Schimperi*, Hochst. et Steud.**Abundant.—*B.C.S.****Pennisetum*, Pers.****584. *Pennisetum* *dichotomum*, Delile.**Common.—*B.C.S.*, *Schweinf.*

585. * Pennisetum cenchroides, Pers.

Very common.—*B.C.S., Schweinf.*

586. * Pennisetum orientalis, Rich.

This is an addition to the flora of Sokotra.

Aduna slopes (400-1500 ft., No. 141, 21. XII. 98).—*H.O.F.*

Rhynchelytrum, Hochst.**587. † Rhynchelytrum microstachyum, Balf. fil., Op. cit. Tab. XCVIII. A.**

Galonsir ; Hadibu.—*B.C.S.*

588. † Rhynchelytrum microstachyum, var. albicomum, Balf. fil

Galonsir ; Hadibu.—*B.C.S., Schweinf.*

Tragus, Haller.**589. Tragus racemosus, Desf.**

Common.—*B.C.S.*

Imperata, Cyr.**590. * Imperata arundinacea, Cyr.**

Occasional.—*B.C.S.*

Near Khor Garieh.—*H.O.F.*

Arthraxon, Beauv.**591. Arthraxon molle, Benth. et Hook.**

Common.—*B.C.S., Schweinf.*

Heteropogon, Pers.**592. Heteropogon hirtus, Pers.**

Common on hill slopes.—*B.C.S., Schweinf.*

Andropogon, Linn.**593. Andropogon (Cymbopogon) hirtus, Linn.**

Abundant.—*B.C.S., Schweinf.*

594. Andropogon (Cymbopogon) laniger, Desf.

Hills near Galonsir and Hadibu.—*B.C.S., Schweinf.*

595. Andropogon (Gymnandropogon) pertusus, Willd.

Haghier hills.—*B.C.S., Schweinf.*

Chrysopogon, Trin.**596. Chrysopogon Gryllus, Trin.**

Plains about Galonsir.—*B.C.S.*

Anthistiria, *Linn.***597. Anthistiria ciliata**, *Linn.*

Common on the hills.—*B.C.S., Schweinf.*

Apluda, *Linn.***598. * Apluda aristata**, *Linn.*

Common.—*B.C.S., Schweinf.*

Aduna slopes (400-1500 ft., No. 142, 21. XII. 98).—*H.O.F.*

Aristida, *Linn.***599. Aristida** (*Chaetaria*) **adscensionis**, *Linn.*

Very common.—*B.C.S., Schweinf.*

600. Aristida (*Arthratherum*) **murina**, *Cur.*

Near Galonsir.—*B.C.S.*

Sporobolus, *R. Br.***601. Sporobolus spicatus**, *Kunth.*

Not uncommon.—*B.C.S.*

Cynodon, *Rich.***602. Cynodon** (*Fibichia*) **dactylon**, *Rich.*

Near Galonsir.—*B.C.S.*

Chloris, *Swartz.***603. Chloris barbata**, *Swartz.*

Common.—*B.C.S.*

Melanocenchris, *Nees.***604. Melanocenchris Royleana**, *Nees.*

Very common.—*B.C.S., Schweinf.*

Eleusine, *Gärtn.***605. * Eleusine ægyptiaca**, *Pers.*

In many places.—*B.C.S.*

Hadibu Plain (No. 101).—*H.O.F.*

606. * Eleusine indica, *Gärtn.*

Common and cultivated.—*B.C.S., Schweinf.*

607. Eleusine verticillata, *Roeb.*

Haghier hills.—*B.C.S.*

Pappophorum, *Schreb.*

608. **Pappophorum** (*Emeapogon*) **Aucheri**, *Jaub. & Spach*.
Galonsir.—*B.C.S.*
609. **Pappophorum elegans**, *Nees*.
Near Galonsir.—*B.C.S.*

Eragrostis, *Beauv.*

610. **Eragrostis plumosa**, *Link.*
Common.—*B.C.S.*, *Schweinf.*
611. **Eragrostis orientalis**, *Trin.*
Not uncommon.—*B.C.S.*
612. **Eragrostis** (*Leptostachya*) **pilosa**, *Beauv.*
Near Galonsir.—*B.C.S.*
613. **Eragrostis** (*Cataclastos*) **ciliaris**, *Link.*
Common.—*B.C.S.*, *Schweinf.*
614. **Eragrostis** (*Megastachya*) **cynosuroides**, *Rœm. et Schult.*
Near Hadibu.—*B.C.S.*

Æluropus, *Trin.*

615. * **Æluropus repens**, *Parl.*
Shores at Galonsir and Hadibu.—*B.C.S.*, *Schweinf.*
Near foot of Gebel Bitzobur.—*H.O.F.*

Lolium, *Linn.*

616. * **Lolium temulentum**, *Linn.*
Near Aduna.—*B.C.S.*, *H.O.F.*

Lepturus, *R. Br.*

617. † **Lepturus tenuis**, *Balf. fil.*
Plains at the eastern end of island.—*B.C.S.*

Ischnurus, *Balf. fil.*

618. † * **Ischnurus pulchellus**, *Balf. fil.*, *Op. cit.* Tab. XCVIII, B.
Near Galonsir.—*B.C.S.*
Seen on Homhil plateau.—*H.O.F.*

II.—The Flowering Plants of Abd-el-Kuri.

DICOTYLEDONES.

POLYPETALÆ.

CAPPARIDÆ.

Cleome, *Linn.*

1. *Cleome brachycarpa*, *Vahl.*

On plain facing our anchorage in Bander Saleh (Nos. 5, 29, 49 ; 4. XII. 98).—*H.O.F.*

Several forms of this variable species.

RESEDACEÆ.

Reseda, *Linn.*

2. *Reseda viridis*, *Bulf. fil.*

Very abundant on slopes of Gebel Saleh (Nos. 24, 58, 72, 77, 78 ; XII. 98).—*H.O.F.*

We have raised a number of plants of this species in the Royal Botanic Garden, and they have flowered. It has not itself much value as a horticultural plant, but might be useful through its perennial character in crossing for perennial races.

POLYGALEÆ.

Polygala, *Linn.*

3. *Polygala erioptera*, *DC.*

(No. 8 ; 4. XII. 98).—*H.O.F.*

CARYOPHYLLÆ.

Polycarpæa, *Lamk.*

4. *Polycarpæa spicata*, *Arn.*

(No. 18).—*H.O.F.*

5. *Polycarpæa cæspitosa*, *Bulf. fil.*

(No. 39).—*H.O.F.*

PORTULACÆÆ.

Portulaca, *Linn.*

6. *Portulaca oleracea*, *Linn.*

On the plain north of Bander Saleh.—*H.O.F.*

ZYGOPHYLLÆ.**Zygophyllum, Linn.****7. Zygophyllum simplex, Linn.**(Nos. 73, 86).—*H.O.F.***GERANIACEÆ.****Geranium, Linn.****8. Geranium muscatense, Boiss.***H.O.F.***LEGUMINOSÆ.****Crotalaria, Linn.****9. Crotalaria leptocarpa, Balf. fil., Op. cit. Tab. XIV, A.**Plain in front of anchorage (No. 14 ; 3. XII. 98).—*H.O.F.***Lotus, Linn.****10. Lotus arabicus, Linn. var. trigonelloides, Webb and Benth.**(Nos. 7, 9, 21, 69).—*H.O.F.***Indigofera, Linn.****11. Indigofera leptocarpa, Hochst. and Steud.**(Nos. 20, 23).—*H.O.F.***Tephrosia, Pers.****12. Tephrosia (Reineria) Apollinea, DC.**(Nos. 44, 70 ; 4. XII. 98).—*H.O.F.***Acacia, Willd.****13. Acacia eburnea, Willd.**(Nos. 63, 79 ; 4. XII. 98).—*H.O.F.***CRASSULACEÆ.****Kalanchoe, Adans.****14. Kalanchoe rotundifolia, Haw.**On limestone rocks of Gebel Saleh.—*H.O.F.*

Seeds of this species were collected.

CUCURBITACEÆ.**Cucumis, Linn.****15. Cucumis prophetarum, Linn.**(No. 38 ; 4. XII. 98).—*H.O.F.*

FICOIDEÆ.**Aizoon, Linn.****16. Aizoon canariense, Linn.**(No. 80).—*H.O.F.***Orygia, Försk.****17. Orygia decumbens, Försk.**

Seeds of this species were collected.

UMBELLIFERÆ.**Carum, Linn.****18. Carum (Trachyspermum) pimpinelloides, Balf. fil.**(No. 93).—*H.O.F.*

A seedling, probably of this species, is in the collection under No. 16.

GAMOPETALÆ.**RUBIACEÆ.****Hedyotis, Linn.****19. Hedyotis pulvinata, Balf. fil.**(Nos. 60, 66).—*H.O.F.***COMPOSITÆ.****Pulicaria, Gärtn.****20. Pulicaria stephanocarpa, Balf. fil.**(Nos. 51, 55, 56).—*H.O.F.***Lactuca, Linn.****21. Lactuca rhynchocarpa, Balf. fil.**(No. 30).—*H.O.F.***Heterachæna, Fresen.****22. Heterachæna massaviensis, Fresen.**(No. 70 bis).—*H.O.F.***PLUMBAGINEÆ.****Statice, Linn.****23. Statice cylindrifolia, Försk.**(Nos. 6, 81 ; 3. XII. 98).—*H.O.F.***ASCLEPIADEÆ.****Glossonema, Dcne.****24. Glossonema Revoili, Frauch.**(Nos. 42, 43, 53).—*H.O.F.*

Cochlanthus, Balf. fil.**25. Cochlanthus socotranus, Balf. fil., Op. cit. Tab. XLIX.**

(Nos. 74, 76, 83, 85 ; 4. XII. 98). A small tree with beautiful foliage growing on the slope of Gebel Saleh in abundance.—*H.O.F.*

We have seedlings of this in the Royal Botanic Garden. The dried material is not sufficient for identification, there being no flowers.

BORAGINÆÆ.**Heliotropium, Linn.****26. Heliotropium undulatum, Vahl.**

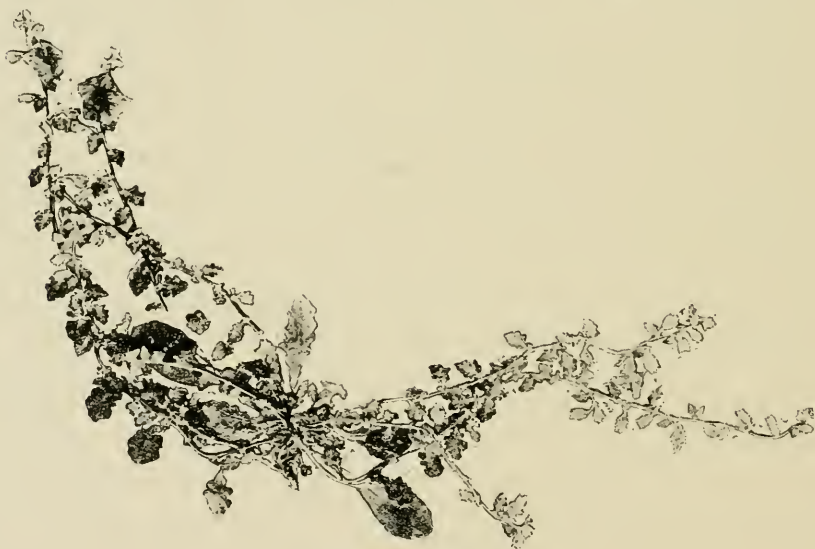
(Nos. 3, 4, 17, 31, 82, 97 ; 3. XII. 98).—*H.O.F.*

Trichodesma, R. Br.**27. Trichodesma laxiflorum, Balf. fil.**

(Nos. 2, 27, 64 ; 3. XII. 98).—*H.O.F.*

CONVOLVULACEÆ.**Convolvulus, Linn.****28. † Convolvulus Granti, Bal. fil., sp. nov.**

Herba rhizomate lignoso verticali, caulibus plurimis radiatim prostratis



CONVOLVULUS GRANTI.

tenuiter virgatis simplicibus elongatis fere ad 6 poll. cano-villosis. Folia rhizomatis infima rosulata elongato-spathulata longe petiolata subsinuata apice subacuta $1\frac{3}{4}$ poll. longa, $\frac{1}{2}$ poll. lata, superiora gradatim oblanceolata crenato-dentata v. suberenato runcinata v.

pinnatifida lobis paucis rotundatis, pubescentia, caulina lanceolata v. sublyrata v. ovata v. subrhomboidea breviter petiolata v. subsessilia grosse paucinque crenata v. lobis paucis rotundatis lateralibus, lobo terminali triangulari, coriacea, dense cano-villosa, $\frac{1}{4}$ - $\frac{3}{4}$ poll. longa, $\frac{1}{8}$ - $\frac{1}{4}$ poll. lata. Flores solitarii rarissime bini, in axillis bractearum foliacearum ad apicem ramulosum racemose positi, pedicellis $\frac{1}{4}$ - $\frac{1}{8}$ poll. longis ad medium bibracteolatis villosis bracteis longioribus. Sepala $\frac{3}{16}$ poll. longa extus villosa, intus glabra, lanceolata acuta interiora lato margine membranacea. Corolla $\frac{1}{2}$ poll. longa alba extus ad angulos hirsuta. Ovarium glabrum. Semina immatura glabra.

(Nos. 13, 45, 46, 50; 3-4, XII. 98.) Abundant on the plain north of Bander Saleh.—*H.O.F.*

A pretty prostrate herb, and readily distinguished from all described forms. I give here a photograph of one of the dried specimens.

Breweria, R. Br.

29. **Breweria** (Seddera) **fastigiata**, *Balf. fil.*, Op. cit. Tab. LVIII.

(No. 92).—*H.O.F.*

Cuscuta, Linn.

30. **Cuscuta planiflora**, *Ten.* var. **globulosa**, *Balf. fil.*

(No. 33 on *Glossonema*; No. 48 on a Composite; 4, XII. 98).—*H.O.F.*

SOLANACEÆ.

Lycium, Linn.

31. **Lycium europæum**, *Linn.*

(Nos. 32, 96).—*H.O.F.*

SCROPHULARINEÆ.

Anticharis, Endl.

32. **Anticharis arabica**, *Endl.*

(No. 19).—*H.O.F.*

Linaria, Juss.

33. **Linaria Elatine**, *Linn.*

(No. 94).—*H.O.F.*

A widespread Eastern plant, not known from Sokotra.

Campylanthus, Roth.

34. **Campylanthus spinosus**, *Balf. fil.*, Op. cit. Tab. LXI.

(No. 61).—*H.O.F.*

OROBANCHACEÆ.

Orobanche, Linn.

35. **Orobanche** (Osproleon) **abyssinica**, *Ach. Rich.*

(No. 90). Near summit of Gebel Saleh.—*H.O.F.*

ACANTHACEÆ.**Ruellia, Linn.****36. Ruellia patula, Jacq.**(Nos. 47, 81). — *H.O.F.***Blepharis, Juss.****37. Blepharis edulis, Pers.**(No. 91). — *H.O.F.*

A plant of Arabia, Persia, and North-West India; not known from Sokotra.

MONOCHLAMYDEÆ.**NYCTAGINEÆ.****Boerhaavia, Linn.****38. Boerhaavia scandens, Linn.**(Nos. 10, 95). — *H.O.F.*

Seeds of this species were collected.

ILLECEBRACEÆ.**Lochia, Balf. fil.****39. Lochia bracteata, Balf. fil., Op. cit. Tab. LXXXIV.**(Nos. 41, 54, 84; 4. XII. 98). — *H.O.F.*

We have young plants raised in the Botanic Garden.

AMARANTACEÆ.**Ærua, Forsk.****40. Ærua microphylla, Moq. Balf. fil., Op. cit. Tab. LXXXV.**(No. 12). — *H.O.F.***CHENOPODIACEÆ.****Suæda, Forsk.****41. Suæda monoica, Forsk.**(No. 87). — *H.O.F.***Salsola, Linn.****42. † Salsola cycloptera, O. Stapf., sp. nov.**

Fruticulus ramosissimus glaberrimus: rami ramulique pallidi vel albidi. Folia alterna saepe in ramulis abbreviatis patulis approximata, eum basi persistente calloso-incrassata articulata, cylindrica vel clavato-cylindrica, obtusissima, glauca, carnosa, 3-8 lin. longa. Flores ad foliorum axillas solitarii, distantes vel versus ramulorum apices dense congesti (tunc folia floralia saepe brevissima, bracteiformia), libacteolata: bracteolae plus minusve naviculares vel cochleares marginibus hyalinis exceptis carnosae, circiter $\frac{3}{4}$ lin. longae. Perianthium sub anthesi vix $1\frac{1}{4}$ lin. longius, ad fere medium 5-lobum, tubo cupulari, lobis conniventibus apice salpe inflexis margine hyalinis basi carnosulis gibbosis,

gibbis mox in alas coalescentes dilatatis. Stamina 5; filamenta basi cum lobulis minutis alternantia et cum iis in anulum tenuem brevissimum connata, plerumque tenuia, e perianthio exserta, in floribus serotinis brevissima latiuscula et cum antheris inclusa: antherae (florum serotinorum tantum notae) $\frac{1}{3}$ lin. longae, connectivo paululo producto obtuso. Ovarium ellipsoides-oblongum; stylus brevis; stigmata 2 vel 3, recurva vel revoluta, tantum in latere ventrali papillosa. Fructu perianthium ampliatus, tubo e basi dilatato spongioso excavato cylindrico ad fere 1 lin. longo, segmentis apice inflexis arcte conniventibus, alarum disco 3 lin. dimetiente, albo, crenulato vel lobulato vel plusminusve 5-lobato lobis saepe inaequalibus. Fructus praeter verticem convexum perianthii tubo arcte inclusus, pericarpio vertice spongioso excepto tenui. Semen exalbuminosum: testa tenuissima; embryo plerumque horizontalis vel obliquus, rarius erectus, planospiralis viridis. A caeteris generis speciebus periantheo fructifero ultra medium tubuloso, ore ala dorsali scariosa horizontli annulari crenulata, rarius plusminusve 5-lobata instructo distincta.

(No. 37). On the plain fronting our anchorage in Bander Saleh.—*H.O.F.* The rather long tube of the mature perianth and the usually complete fusion of the originally distinct wing primordia into a single ring-shaped wing distinguish this species from all the other species of *Salsola* which I know. There were only few flowers among the very numerous fruits in the specimens which I examined, and they seemed to belong to a late series and somewhat different form, a condition not uncommon in *Chenopodiaceae*. Whilst the filaments of the mature perianths with fully developed wings were long and exserted from the perianth, those of the late series were short and enclosed in the perianth, together with the anthers. This was also the case in a flower where the embryo had already formed, although only one anther was open and the wings were still quite small. The flowers, of this late series at least, are protogynous, and the case just mentioned points to a tendency in the late flowers, towards becoming unisexual.—*O. Stapf*.

Dr. O. Stapf, of the Herbarium, Royal Gardens, Kew, has been so good as to examine and describe this plant.

This genus is not represented in Sokotra.

EUPHORBIACEÆ.

Euphorbia, Linn.

43. *Euphorbia* (Anisophyllum) **Chamæsyce**, Linn.

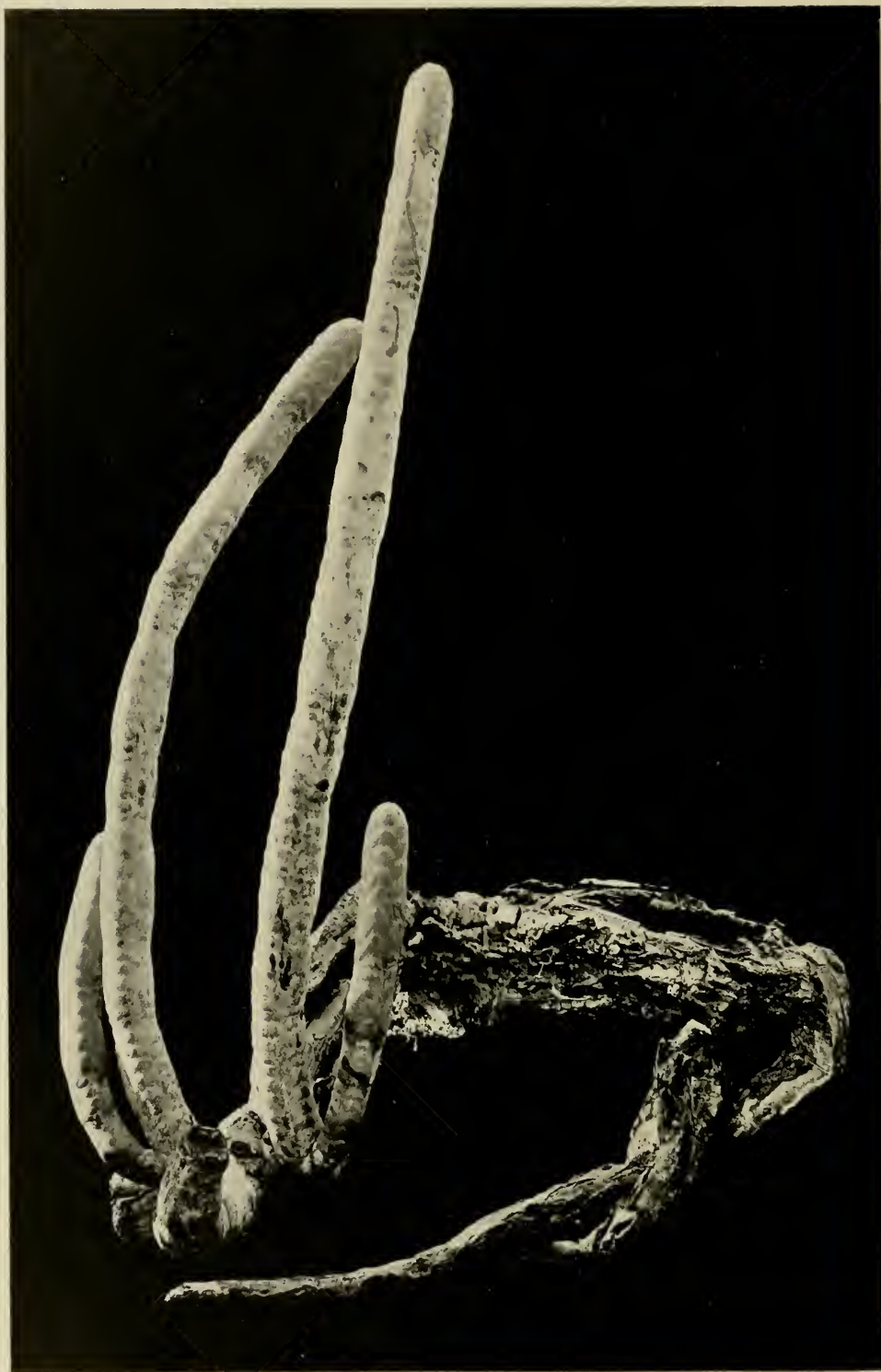
(No. 59).—*H.O.F.*

44. *Euphorbia* (Tirucalli) **Schimperi**, Presl.

(No. 40; 4. XII. 98).—*H.O.F.*

45. *Euphorbia* (Tirucalli) **oblanceolata**, Balf. fil.

(No. 89).—*H.O.F.*



EUPHORBIA ABDELKURI.

46. *Euphorbia Abdelkuri*, Balf. fil., sp. nov.

Planta arborea non aculeata truncis lignosis contortis cortice corrugato inter superque scopulos et lapides jacentibus. Rami carnosiusculi intus spongiosi latice sulphureo in speciminibus nostris 3-pedales et 2 poll. lati, subcylindrici hic illic constrictione forsitan limitatione turionis solennis circumligati, obscure 5-costati aphylli sed costis tuberculis seriatis segregatis ornatis ibique cicatricibus parvis foliorum juvenilium et ramulorum floralium (?) axillarium notatis.

The figure (on page 528) is taken from the largest specimen, which was brought home in a large crate, and was in excellent condition on arrival, and, although it has not yet rooted, it is as fresh as on the day upon which it arrived.

This is a most interesting discovery. The plant does not occur in Sokotra, and, so far as I can discover—and I am indebted to Mr. J. H. Bunkhill, of Kew, for assistance in my search—it differs from all known succulent forms of *Euphorbia*. Unfortunately we have not complete material of the species. Upon one stem I found some withered remains of flowers, but they were of no service beyond furnishing evidence confirmatory of the identification of the plant as a *Euphorbia*. As we have the plant now alive in the Royal Botanic Garden, we may hope to be able to complete the description of it at no distant date.

The stem presents some curious features. The fresh shoots have an outer shell about a quarter of an inch thick surrounding a loose spongy central portion. The epidermis is thickly studded with stomata, each girt by subsidiary cells. The surface walls of the epidermal cells are entirely cuticularised, and layer after layer of cuticle is laid down upon them so that ultimately a grey cuticular crust which scales off covers the older part of the shoot. It is an exceptional character which I do not think has been observed in any other plant that this cuticular layer shows distinctly its origin from individual cells—that is to say, the cuticular scale is made up of a series of prisms, each of which exhibits a stratification and represents the cuticle that has been formed by a particular cell of the epidermis. De Bary (Comp. Anat. Engl. Ed., p. 80) refers to an isolated exception of such a separation into “angular pieces, each corresponding to an individual cell,” having been brought about by chemical and mechanical means in the cuticle of *Cereus peruvianus*. In our *Euphorbia* the separation is normal, and the limits of the several cells are readily observed in the cuticle by examination with even a pocket-lens. A further interesting point is that the stomatic guard-cells retain a cellulose character in their walls, as do also the inner subsidiary cells, consequently they are sunk in pits of the cuticle, and the contrast between them and the surrounding cuticle is readily made evident by suitable reagents. A careful anatomical investigation of the whole structure of this plant

will, I hope, be possible when the plants we now have alive have started into growth.

[This *Euphorbia* grows all up the side of Gebel Saleh, from about the upper two-thirds (500-1500 ft.), sending up its leafless stems like a forest of green candles. The root stock seemed to be continuous, if not throughout the entire colony on the mountain side, for at least very great distances. It must, I think, resemble some Somaliland species, as our Somali butler recognised it as being a plant familiar to him and spoke of it by a Somali name, which I have recorded as *Ergin*. He it was who also recognised the *Edithcolea sordida* as a Somaliland plant, where, indeed, a nearly related species does occur, as Mr. N. E. Brown informs me.—*H.O.F.*]

MONOCOTYLEDONES.

ORCHIDEÆ.

Habenaria, *Wild.*

47. *Habenaria socotrana*, *Balf. fil.*, Op. cit. Tab. LXXXII, B.

Near top of Gebel Saleh.—*H.O.F.*

IRIDEÆ.

Romulea, *Maratti.*

48. *Romulea purpurascens*, *Tenore*, var. *edulis*, *Baker.*

Near summit of Gebel Saleh.—*H.O.F.*

LILIACEÆ.

Asparagus, *Linn.*

49. *Asparagus africanus*, *Lamk.*, var. *microcarpus*, *Balf. fil.*

(No. 34).—*H.O.F.*

Asphodelus, *Linn.*

50. *Asphodelus fistulosus*, *Linn.*, var. *tenuifolius*, *Baker.*

On Gebel Saleh.—*H.O.F.*

Dipcadi, *Medicus.*

51. *Dipcadi* (*Tricharis*) *Balfouri*, *Baker.*

(No. 52).—*H.O.F.*

COMMELINACEÆ.

Commelina, *Linn.*

52. *Commelina benghalensis*, *Linn.*

H.O.F.

Cyanotis, *Don.*

53. *Cyanotis cristata*, *Reem. and Schult.*

On sandy plain.—*H.O.F.*

CYPERACEÆ.**Cyperus, Linn.**

54. *Cyperus conglomeratus*, *Rothb.*, var. *effusus*, *Boiss.*
(No. 56).—*H.O.F.*

GRAMINEÆ.**Setaria, Beauv.**

55. *Setaria verticillata*, *Beauv.*
(No. 67).—*H.O.F.*

Pennisetum, Pers.

56. *Pennisetum cenchroides*, *Pers.*
(No. 56).—*H.O.F.*

Heterochloa, Desv.

57. *Heterochloa dura*, *Boiss.*
(No. 1, 4. XII. 98).—*H.O.F.*
A Baluchistan plant not known from Sokotra.

Anthistiria, Linn.

58. *Anthistiria ciliata*, *Linn.*
H.O.F.
Seeds of this species were collected.

Sporobolus, R. Br.

59. *Sporobolus minutus*, *Link.*
(No. 36, 3. XII. 98).—*H.O.F.*
An Abyssinian species not known from Sokotra.

Eleusine, Gartn.

60. *Eleusine ægyptiaca*, *Pers.*
(No. 25, 3. XII. 98).—*H.O.F.*

Eragrostis, Beauv.

61. *Eragrostis minor*, *Host.*
(Nos. 22, 26).—*H.O.F.*
This species is not known from Sokotra.

In concluding this Report, I desire to express my obligation to the Director of Kew and to the members of the staff of the Kew Herbarium, and to Mr. C. B. Clarke for the willing help I have received from them in completing the foregoing list. It contains evidence in the description of new species, of the active share of some of them in the working out of the collections, but not of much other aid I gratefully acknowledge.

PLATE XXVI A.

EXACUM FORBESII, *Balf. fil.*, p. 487.Fig. 1. *Branch in flower, natural size.*Fig. 2. *Calyx.*Fig. 3. *Corolla laid open.*Fig. 4. *Stamen.*Fig. 4a. " *in front view.*Fig. 4b. " *in back view.*Fig. 4c. " *in side view.*Fig. 5. *Gynæcium.**Figs. 2-5 are all enlarged.*

Drawn by Mrs. I. B. BALFOUR, from a plant grown in the Royal Botanic Garden,
Edinburgh.



A.B.E. del.

P.W.M. Trap. Chromo

A.J.W. lith.

EXACUM FORBESII.

PLATE XXVI B.

ALOE FORBESII, *Balf. fil.*, p. 511.

Figs. 1, 2. *Plant of natural size, showing habit and inflorescence.*

Fig. 3..... *Bract of raceme.*

Fig. 4..... *Perianth and pedicel.*

Fig. 5..... *Petals removed from perianth.*

Fig. 6..... **a,** *Antisepalous stamen ; b,* *antipetalous stamen.*

Fig. 7..... *Gynaeceum.*

Figs. 3-7 magnified.

Drawn by MRS. I. B. BALFOUR, from a plant grown in the Royal Botanic Garden,
Edinburgh.

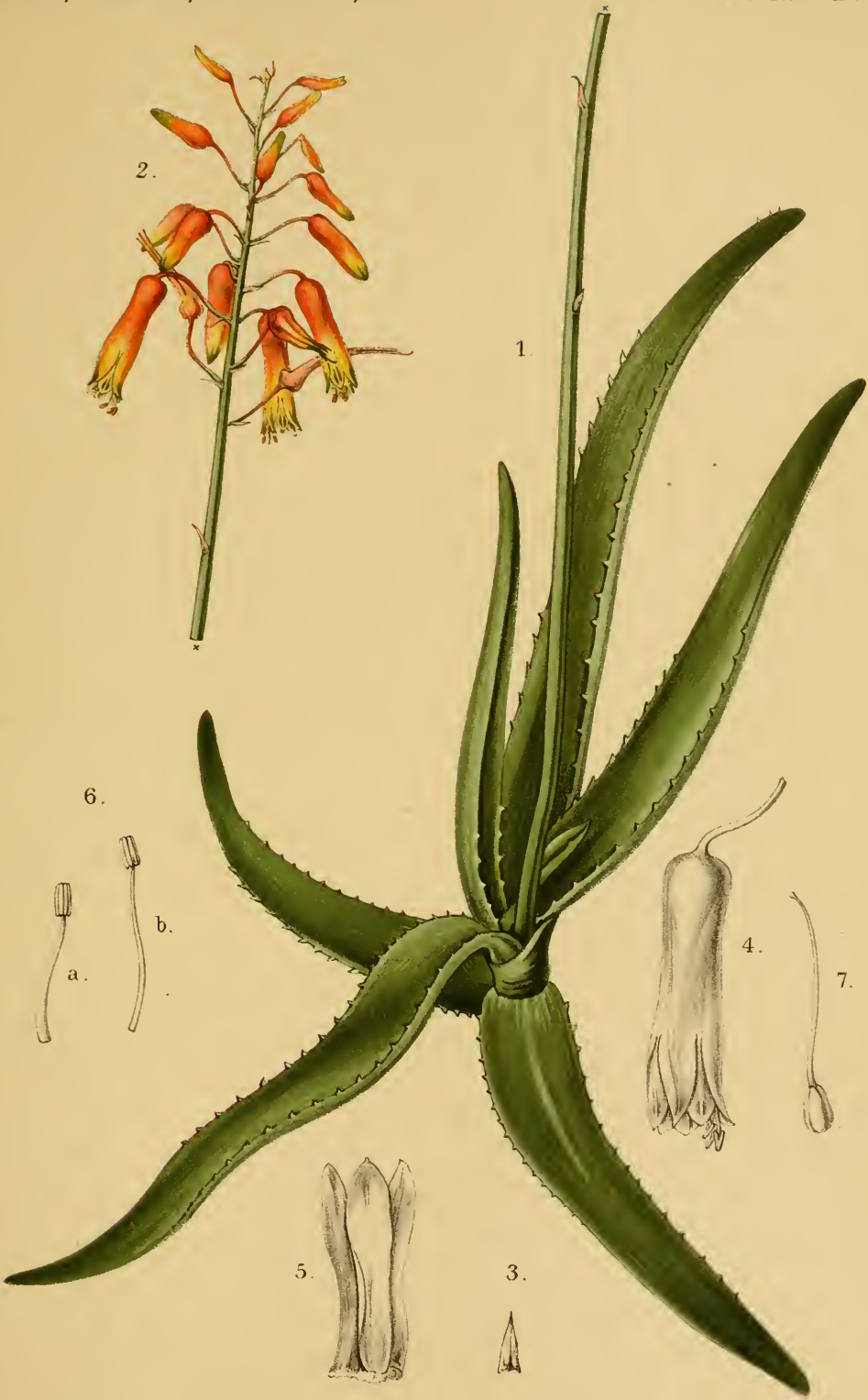


ABB. del.

P.W.M. Tröp imp

ALOE FORBESII.

PLANTÆ CRYPTOGRAMÆ.

Pteridophyta.

By Professor I. B. BALFOUR, F.R.S.

Flowerless Plants.—I.

With the exception of a few ferns and lichens, together with a single *Chara* in Sokotra and a few lichens and handful of sea weeds from Abd-el-Kuri—the species of which have been identified by Professor Balfour, Dr. Darbishire, and Mr. Holmes—no Cryptogamous plants were collected by the expedition. For in regard to Botany our main object, with the limited time at our disposal, was rather to secure as many living plants, bulbs and seeds for propagation at home as possible, than to form a herbarium. The few specimens collected by us in the larger island have, therefore, been indicated in this list extracted from Professor Balfour's *Botany of Sokotra*.—*H.O.F.*

I.—The Ferns, Mosses, and Liverworts of Sokotra.

FILICINÆ.

MARSILEACEÆ.

Marsilea, Linn.

1. *Marsilea coromandelina*, Willd.

In many of the streams in the middle of the island.—*B.C.S.*, Schweinf.

POLYPODIACEÆ.

Adiantum, Linn.

2. *Adiantum Capillus-Veneris*, Linn.

Not frequent.—*B.C.S.*, Schweinf.

3. *Adiantum æthiopicum*, Linn.

Haghier hills south of Hadibu.—*B.C.S.*

4. † * **Adiantum Balfourii**, *Baker*. Balf. fil., Op. cit. Tab. XCIX, A.

Aduna slopes (1000 ft., No. 135, XII. 98). Homhil. This species occurs also on Abd-el-Kuri.—*H.O.F.*

Species of this have given us a crop of young plants in the Royal Botanic Garden, and it will be an interesting addition to horticulture.

Abundant on the hills at the eastern and centre parts of the island.—*B.C.S., Schweinf.*

Cheilanthes, *Swartz*.

5. * **Cheilanthes** (Aleuritopteris) **farinosa**, *Kaulf.* Bot. Mag. t. 4765.

Gebel Bitzobur (rising from the Garieh Plain) at 900 ft.

Hills south-west of Galonsir.—*B.C.S.*

Onychium, *Kaulf.*

6. **Onychium melanolepis**, *Ke.* Hooker Icon. Pl. t. 902.

Hills south-west of Galonsir.—*B.C.S.*

Pellæa, *Link.*

7. **Pellæa** (Cheiloplectron) **concolor**, *Baker*. Hook. Ic. Pl. t. 915.

Haghier hills (over 3000 ft.).—*Schweinf.*

8. **Pellæa** (Platyloma) **viridis**, *Baker*. Hook. Fil. Exot. t. 50.

Kischen (in Haghier *Massif*), over 1800 ft.—*Schweinf.*

Pteris, *Linn.*

9. * **Pteris longifolia**, *Linn.*

Dahamis (1500 ft.).—*H.O.F.*

Very common.—*B.C.S., Schweinf.*

10. **Pteris quadriaurita**, *Retz.* Hook. Sp. Fil. ii. 179, t. 134 B.

Haghier range.—*B.C.S., Schweinf.*

Ceratopteris, *Brong.*

11. **Ceratopteris thalictroides**, *Brong.* Bedd. Ferns South. Ind. t. 75.

Streams near Hadibu.—*Schweinf.*

Asplenium, *Linn.*

12. * **Asplenium Trichomanes**, *Linn.*

Gebel Raggit, limestone outlier of Haghier, south-west of Hadibu (800 ft.).—*H.O.F.*

Haghier hills south of Hadibu.—*B.C.S.*

13. † * **Asplenium Schweinfurthii**, *Baker*. Balfour fil., Op. cit. Tab. C.
Slopes of Aduna (2000 ft.).—*H.O.F.*
Haghier hills south of Hadibu.—*B.C.S.*, *Schweinf.*

14. **Asplenium præmorsum**, *Swartz*. Bedd. Ferns South. Ind. t. 144.
Haghier hills above Hadibu.—*B.C.S.*

Actinopteris, *Link.*

15. * **Actinopteris dichotoma**, *Bedd.*, Ferns South. Ind. 43, t. 124.
Aduna slopes (400-1500 ft., No. 126, 21. XII. 98). Adho Dimellus
(3500 ft.).—*H.O.F.*
Common.—*B.C.S.*, *Schweinf.*

Nephrodium, *Rich.*

16. * **Nephrodium** (*Lastrea*) **crenatum**, *Baker*. Bedd. Ferns South
Ind. t. 95.
Aduna slopes.—*H.O.F.*
Haghier hills above Hadibu.—*B.C.S.*
17. **Nephrodium molle**, *Desr.* Bedd. Ferns South. Ind. t. 84.
On the hills.—*B.C.S.*, *Schweinf.*

Nephrolepis, *Schott.*

18. **Nephrolepis cordifolia**, *Presl.* Bedd. Ferns South. Ind. t. 92.
Haghier hills near Aduna.—*B.C.S.*

Gymnogramme, *Desv.*

19. **Gymnogramme cordata**, *Schlecht.* Hook. & Grev. Ic. Fil. t. 156.
Above Kischen.—*Schweinf.*

MUSCINEÆ.

MUSCI.

Campylopus, *Brid.*

1. **Campylopus introflexus**, *Brid.*
Haghier hills.—*B.C.S.*

Symblepharis, *Montagu.*

2. † **Symblepharis socotrana**, *Mitt.* Balfour fil., Op. cit. Tab. XCIX, B.
Highest points of Haghier.—*B.C.S.*

Weisia, *Hedw.*

3. † **Weisia** (*Hymenostylium*) **socotrana**, *Mitt.*
Near Galousir and Hadibu, and elsewhere common.—*B.C.S.*

4. † **Weisia** (*Hyophila*) **punctulata**, *Mitt.*

Haghier hills.—*B.C.S.*

Tortula, *Hedw.*

5. **Tortula cæspitosa**, *Schwægr.*

Haghier hills, at considerable elevation.—*B.C.S.*

Anictangium, *Hedw.*

6. **Anictangium Balfourii**, *Mitt.*

Sicante Peak of Haghier (over 3000 ft.).—*B.C.S.*

Schlotheimia, *Brid.*

7. † **Schlotheimia Balfourii**, *Mitt.*

Higher parts of Haghier.—*B.C.S.*, ? *Ninmo*.

Philonotis, *Brid.*

8. **Philonotis pungens**, *Mitt.*

Haghier hills south of Hadibu.—*B.C.S.*

Brachymenium, *Hook.*

9. **Brachymenium**, *sp.*

B.C.S.

Bryum, *Linn.*

10. ? **Bryum dichotomum**, *Hedw.*

On slope of Haghier behind Hadibu.—*B.C.S.*

Fabronia, *Ruddi.*

11. † **Fabronia socotrana**, *Mitt.*

Highest peaks of Haghier, near Aduna.—*B.C.S.*

HEPATICÆ.

Lejeunia, *Libert.*

12. **Lejeunia serpyllifolia**, *Libert.*

B.C.S.

Frullania, *Ruddi.*

13. † **Frullania socotrana**, *Mitt.* Balf. fil., Op. cit. Tab. XCIX, C.

On bark.—*B.C.S.*

14. **Frullania squarrosa**, *Nees ab. Esenb.*

On small stems.—*B.C.S.*

Otiona, *Corda*.**15. Otiona Aitonia**, *Forsk.*

On the rocks. Common.—*B.C.S.*

Fimbriaria, *Nees ab. Esenb.***16. † Fimbriaria pusilla**, *Mitt.*

On rocks in many places.—*B.C.S.*

II.—The Ferns of Abd=el=Kuri.

FILICINÆ.

POLYPODIACEÆ.

Adiantum, *Linn.*

1. **Adiantum Balfourii**, *Baker.*

Near the summit of Gebel Saleh (1200 ft.).—*H.O.F.*

Asplenium, *Linn.*

2. **Asplenium Schweinfurthii**, *Baker.*

On slope of Gebel Saleh (1000 ft.).—*H.O.F.*

PLANTÆ CRYPTOGRAMÆ.

Thallophyta.

Fungi.

Characeæ.

Algæ.

Diatomaceæ.

} *Apud* BALFOUR, *Botany of Socotra.*

Lichenes.

By OTTO V. DARBISHIRE, Ph.D.

Algæ ex Abd-el-Kuri.

By E. M. HOLMES, F.L.S.

Flowerless Plants.—II.

I.—The Fungi, Lichens, Charas, Sea-Weeds and Diatoms of Sokotra.

FUNGI.

ASCOMYCETES.

Pyrenomycetes.*

SPHÆRIACEI.

Sphæria, Haller.

1. † *Sphæria* (Rosellinia) *opaca*, Cooke.
On rotten wood.—*B.C.S.*
2. † *Sphæria* (Immersa) *hyalodidyma*, Cooke.
Immersed in wood.—*B.C.S.*
3. † *Sphæria* (Kahnusia) *rubronigra*, Cooke.
On naked wood.—*B.C.S.*
4. † *Sphæria* (Thyridium) *colliculus*, Cooke.
On naked wood.—*B.C.S.*

Lophiostoma, Fries.

5. † *Lophiostoma* (Lophiotrema) *Socotræ*, Cooke.
On naked wood.—*B.C.S.*

Eutypa, Tul.

6. *Eutypa* *Acharii*, Tul.
On dry rotten wood. Galonsir Plain.—*B.C.S.*
7. *Eutypa aspera* (Nits), var. *lignicola*, Cooke.
B.C.S.

Valsa, Adans.

8. *Valsa stellulata*, Fries.
Tree stump, Galonsir Plain.—*B.C.S.*

* This list is extracted from Prof. Balfour's *Botany of Socotra*.—*H.O.F.*

Ostropa, Fries.**9. Ostropa cinerea, Fries.**

On wood, hill slopes, near Galonsir. — *B.C.S.*

Dothidia, Fries.**10. † Dothidia (Dothidella) Salvadoræ, Cooke.**

On leaves of *Salvadora persica* — *B.C.S.*

Discomycetes.**Ailopaplum, Lib.****11. † Ailopaplum lirelliforme. Cooke.**

On dry wood. — *B.C.S.*

Asterina, Lev.**12. † Asterina dichænoides, Cooke.**

On living bark. — *B.C.S.*

Sphinctrina, De Not.**13. Sphinctrina microcephala, Nyl.**

In thallus of *Petrasaria cicatricosa* on branches of *Balsamodendron*, above Wadi Digal (900 ft.).

Lichenes.*

The Lichens of Sokotra are not yet very fully known, but the collections made by Drs. Balfour and Schweinfurth some twenty years ago, and by the Sokotra Expedition (chiefly collected by Dr. H. O. Forbes) in 1898-99 make up a grand total of 47 genera and 135 species.

Those brought over by Balfour and Schweinfurth were determined by the late J. Müller-Argov., and they numbered in all 47 genera and 130 species, of which 33 genera and 73 species were new to science.† The genus *Sphinctrina*, De. Not., of Müller's List (*Botany of Socotra*, p. 347) being a fungus, is not mentioned here. On the other hand, the genus *Faristolara*, Turn., has been introduced, although the only species belonging to it is not new to Sokotra.

* By Dr. O. V. Darbshire.

† Dr. J. Müller, *Diagnoses Lichenum Socotrensiun novorum a participibus expeditionum Prof. Bayley Balfour et Dr. Schweinfurth lectorum.*—Proceedings of the Royal Society of Edinburgh, vol. xi. p. 457-472 (1882). This paper contains the new genera and new species by Müller-Argov. only. His complete list is to be found in Balfour's *Botany of Socotra*, pp. 343 to 390.

The Lichens collected by the Forbes-Grant Expedition on the Islands of Sokotra and Abd-el-Kuri number 10 genera with 17 species, not including two sterile specimens which I am unable to name. Eight species turned out to be new for Sokotra, and these were all known to science previously.

The most interesting additions are the larger specimens of *Usnea florida*, Ach., and *U. articulata*, Hoffm.

The following list is made up of the Lichens collected by Balfour and Schweinfurth, with the additions made by Dr. H. O. Forbes. Nearly all those, the specific names of which are due to Müller-Argov., have been described only from Sokotra. The names of Dr. Forbes' plants are marked with an asterisk.

Through the kindness of Mr. William Barbey, the owner of the Herbarium Boissier, in which is incorporated the splendid herbarium of J. Müller-Argov., and with the assistance of Mr. Eugène Autran, I was able to compare several of the Sokotra Lichens of the present expedition with the original specimens of Müller-Argov. I wish to thank both these gentlemen for thus materially helping me in the determination of some of the species mentioned in the following list.—*O.F.D.*

CONIOCARPI.

CALICIACEI.

Calicium, *De Not.*

1. † **Calicium leucinum**, *Müll. Arg.*

Lignicolous.—*B.C.S.*

DISCOCARPI.

GRAPHIDACEI.

Dirina, *El. Fries.*

2. **Dirina Ceratonix** (*Ach.*) *de Not.*

Corticulous.—*B.C.S.*

3. † **Dirina cinerea**, *Müll. Arg.*

Calcareous rocks.—*B.C.S.*

4. † **Dirina cinerea**, *Müll. Arg.*, f. **sorediosa**, *Müll. Arg.*

Calcareous rocks.—*B.C.S.*

5. † **Dirina immersa**, *Müll. Arg.*

Calcareous rocks.—*B.C.S.*

6. † **Dirina immersa**, *Müll. Arg.*, f. **sorediata**, *Müll. Arg.*

Calcareous rocks.—*B.C.S.*

7. **Dirina repanda**, *Fries.*

On calcareous rocks.—*B.C.S.*

Opegrapha, Ach.**8. Opegrapha (Lecanactis) chloroconia, Müll. Arg.**

On small branches, bark of large branches, and decorticated trunks
—*B.C.S.*

9. † Opegrapha (Lecanactis) vestita, Müll. Arg.

On decorticated wood.—*B.C.S.*

10. † Opegrapha (Lecanactis) elegans, Müll. Arg.

On decorticated wood.—*B.C.S.*

11. † Opegrapha (Lecanactis) subcalcareia, Müll. Arg.

On calcareous rocks.—*B.C.S.*

12. † Opegrapha (Lecanactis) cretacea, Müll. Arg.

On calcareous rocks.—*B.C.S.*

13. † Opegrapha Bonplandi, Fée.

On decorticated wood.—*B.C.S.*

14. † Opegrapha Dracænarum, Müll. Arg.

On branches of *Dracena*, with *Graphina varians*, above Wadi Kischen
(2100 ft.).—*Schweinf.*

15. † Opegrapha microspora, Müll. Arg.

Corticolous.—*B.C.S.*

16. † Opegrapha sororiella, Müll. Arg.

On bark of branches.—*B.C.S.*

17. Opegrapha melanospila, Müll. Arg.

Parasitic in thallus of *Parmelia perforata*, Ach., and of *P. urceolata*, Eschw.,
above Wadi Kischen (2400 ft.).—*Schweinf.*

Melaspilea, Nyl.**18. † Melaspilea stigmatea, Müll. Arg.**

In thallus of *Dirina repanda*, Fries.—*B.C.S.*

Graphis, Ach.**19. † Graphis brachycarpa, Müll. Arg.**

On branches, near Wadi Kischen (2100 ft.).—*Schweinf.*

20. Graphis comma, Nyl.

Above Wadi Kischen, on small branches (2100 ft.).—*Schweinf.*

21. Graphis tenella, Ach.

Above Wadi Kischen, on small branches (2100 ft.).—*Schweinf.*

Phæographis, Müll. Arg.

22. † **Phæographis inusta**, *Ach.*, var. **radians**, *Müll. Arg.*
Corticolous.—*B.C.S.*
23. **Phæographis inusta**, *Müll. Arg.*, var. **simpliciuscula**, *Müll. Arg.*
Corticolous.—*B.C.S.*

Phæographina, Müll. Arg.

24. † **Phæographina Balfourii**, *Müll. Arg.*
On tree trunks.—*B.C.S.*

Graphina, Müll. Arg.

25. † **Graphina varians**, *Müll. Arg.*
On smaller branches of *Dracena* near Wadi Kischen (2100 ft.).—*B.C.S.*
Schweinf.
26. † **Graphina socotrana**, *Müll. Arg.*
On bark of trees.—*B.C.S.*

Arthonia, Ach.

27. **Arthonia cinnabarina**, *Fée.*, var. **adspersa**, *Nyl.*
On tree trunks.—*B.C.S.*
28. **Arthonia stictaria**, *Nyl.*
On *Sticta aurata*, above Wadi Kischen (3000 ft.).—*Schweinf.*
29. **Arthonia polymorpha**, *Ach.*
Bark of smaller branches.—*B.C.S.*
30. † **Arthonia calospora**, *Müll. Arg.*
Bark of larger branches.—*B.C.S.*
31. † **Arthonia complanatulæ**, *Müll. Arg.*
On bark of trunk on larger branches of trees.—*B.C.S.*

Arthothelium, Mass.

32. † **Arthothelium leucocarpum**, *Müll. Arg.*
On bark of thick branches.—*B.C.S.*
33. † **Arthothelium emersum**, *Müll. Arg.*
On tree trunks.—*B.C.S.*

Enterographa, Fée.

34. † **Enterographa affinis**, *Müll. Arg.*
On bark, among other lichens.—*B.C.S.*

35. † **Enterographa lactea**, Müll. Arg.

On bark of thicker branches.—*B.C.S.*

36. † **Enterographa fraterculans**, Müll. Arg.

Corticolous.—*B.C.S.*

Minksia, Müll. Arg.37. † **Minksia cæsiella**, Müll. Arg.

Corticolous on the larger branches.—*B.C.S.*

38. † **Minksia candida**, Müll. Arg.

Corticolous.—*B.C.S.*

Chiodecton, Ach.39. † * **Chiodecton nanum**, Müll. Arg.

The thallus of the specimen growing on the bark of a tree is very thick and of a white colour. The apothecia are well developed. I was able to compare it with original specimens of *C. nanum*, Müll. Arg., *C. circumscissum*, Müll. Arg., and *C. socotranum*, Müll. Arg.

On wood. Matagoti, E. Sokotra.—*H.O.F.*

On branches of *Dracena* along with *Graphina vacians*, and *Opegrapha Dracenarum*, above Wadi Kischen (2100 ft.).—*Schwein.*

40. † **Chiodecton circumscissum**, Müll. Arg.

Corticolous on smaller branches.—*B.C.S.*

41. † **Chiodecton socotranum**, Müll. Arg.

On calcareous rocks.—*B.C.S.*

42. **Chiodecton farinaceum**, Fée.

At Wadi Kischen, on small branches.—*Schwein.*

Roccella, DC.43. **Roccella tinctoria**, DC.

On granite above Wadi Kischen (3000 ft.).—*Schwein.*

44. **Roccella Montagnei**, Bélanger.

Corticolous on branches of *Dracena* on Wadi Kischen (2100 ft.), and on *Balsamodendron* above Wadi Digal (900 ft.).—*Schwein.*, *B.C.S.*

45. * **Roccella Balfourii**, Müll. Arg. (Plate xxvii. figs. 1, 2.)

Homhil; E. Sokotra.—*H.O.F.*

The specimens were larger than any I have hitherto seen,* attaining a height of 7-8 cm., and bearing numerous apothecia and spermogonia.

The section through an apothecium is shown ($\times 55$) in fig. 1. The

* Darbishire, O. V., *Monographia Roccellarum*, p. 43, Stuttgart, 1898.

strongly developed epithecium, which gives the white colour to the whole fruit, is very apparent. The thallus shows the very characteristic white colour.

On rocks by the sea.—*B.C.S.*

46. * **Roccella fuciformis** (*L.*), *Ach.*

Not previously recorded from Sokotra.

E. Sokotra. On rocks.—*H.O.F.*

LECIDEACEI.

Blastenia, *Mass.*

47. **Blastenia poliotera**, *Müll. Arg.*

On northern ascent of Mt. Bagne (1500 ft.).—*Schwein.*

48. † **Blastenia albido-cœrulescens**, *Müll. Arg.*

On quartz rocks.—*B.C.S.*

49. † **Blastenia cretacea**, *Müll. Arg.*

On calcareous rocks.—*B.C.S.*

50. † **Blastenia variabilis**, *Müll. Arg.*

On quartz rocks, above Wadi Kischen (1800-1950 ft.).—*B.C.S.*, *Schwein.*

Lecidea, *Ach.*

51. † **Lecidea** (*Biatora*) **contractula**, *Müll. Arg.*

On quartz rocks above Wadi Kischen (1800 ft.).—*Schwein.*

52. † **Lecidea** (*Biatora*) **plumbeella**, *Müll. Arg.*

On quartz rocks above Wadi Kischen (1950 ft.).—*Schwein.*

Patellaria, *Müll. Arg.*

53. † **Patellaria** (*Biatorina*) **obfuscata**, *Müll. Arg.*

On quartz rocks.—*B.C.S.*

54. † **Patellaria** (*Catillaria*) **sigmoidea**, *Müll. Arg.*

On quartz rocks.—*B.C.S.*

55. † **Patellaria** (*Bacidia*) **socotrana**, *Müll. Arg.*

On dead wood.—*B.C.S.*

56. † **Patellaria** (*Raphiospora*) **decussata**, *Müll. Arg.*

On calcareous rocks.—*B.C.S.*

CLADONIACEI.

Cladonia, *Hoffm.*

57. **Cladonia verticillata**, *Flörke.*

Terricolous.—*B.C.S.*

PERTUSARIACEI.

Pertusaria, DC.

58. †
- Pertusaria schizostoma**
- , Müll. Arg.

On small branches.—*B.C.S.*

59. †
- Pertusaria cicatricosa**
- , Müll. Arg.

On branches of *Balsamodendron*, above Wadi Digal (600 ft.).—*B.C.S.*, Schweinf.

60. † *
- Pertusaria socotrana**
- , Müll. Arg.

Adho Dimellus (4000 ft.), on stone.—*H.O.F.*

On calcareous and quartzose rocks.—*B.C.S.*, Schweinf.

Müller's specimens showed four spores in each ascus, whereas I found eight. The number of the spores in each ascus, however, varies very much in the *Pertusariæ*. I saw original specimens of this species, and of *P. subflavens*.

- 61.
- Pertusaria flavens**
- , Nyl.

B.C.S.

62. † *
- Pertusaria subflavens**
- , Müll. Arg.

The spores measured as much as $48-58 \times 160 \mu$, Müll. Arg. putting their size down as $55 \times 110-130 \mu$.

E. Sokotra, on branches.—*H.O.F.*

On small branches of *Hypericum*, above Wadi Kischen (3000 ft.).—*Schweinf.*

- 63.
- Pertusaria lutescens**
- , Krph.

On branches and branchlets of *Balsamodendron*, along with *P. cicatricosa*, Müll. Arg., above Wadi Digal (900 ft.).—*Schweinf.*

Variolaria, Turn.

64. †
- Variolaria xantholeuca**
- (Müll. Arg.), Darbish.

On quartz rocks above Wadi Kischen (1800 ft.).—*Schweinf.*

URCEOLARIACEI.

Urceolaria, Ach.

- 65.
- Urceolaria actinostoma**
- , Pers.

On quartz rocks, above Wadi Digal (1650 ft.).—*Schweinf.*

PARMELIACEI.

Callopisma, De Not.

- 66.
- Callopisma aurantiacum**
- , var.
- salicinum**
- , Mass.

Above Wadi Digal on bark of *Balsamodendron* (900 ft.).—*B.C.S.*, Schweinf.

- 67.
- Callopisma aurantiacum**
- , var.
- isidiosellum**
- , Müll. Arg.

On branches of *Balsamodendron*, above Wadi Digal (990 ft.).—*B.C.S.*

68. Callopisma citrinum, Mass.

On bark of trees, with preceding species.—*B.C.S.*

69. Callopisma steropeum, Körb.

On quartz rocks, above Wadi Kischen (2100 ft.).—*B.C.S., Schweinf.*

70. Callopisma pyraceum, Müll. Arg.

On branches.—*Schweinf.*

Lecanora, Ach.**71. Lecanora atra, Ach.**

Corticolous and saxicolous.—*B.C.S.*

72. † Lecanora notha, Müll. Arg.

Saxicolous, on northern sides of Mt. Bøgal (1500 ft.).—*Schweinf.*

73. Lecanora subfusca, Ach., var. chlarona, Ach.

Above Wadi Digal, on decorticated wood of *Balsamodendron* (900 ft.).—*B.C.S., Schweinf.*

74. Lecanora angulosa, Ach.

Ramicolous.—*Schweinf.*

75. † Lecanora socotrana, Müll. Arg.

On quartz rocks; common and characteristic.—*B.C.S.*

At Wadi Kischen (1800-1950 ft.).—*Schweinf.*

76. † Lecanora socotrana, Müll. Arg., f. livido-nigricans, Müll. Arg.

B.C.S.

Amphiloma, Körb.**77. † Amphiloma deplanatum, Müll. Arg.**

On calcareous rocks.—*B.C.S.*

78. † Amphiloma Balfourii, Müll. Arg.

On calcareous rocks.—*B.C.S.*

79. † Amphiloma granuliferum, Müll. Arg.

On quartz rocks near Wadi Kischen, at northern foot of Haghier mountains.—*Schweinf.*

80. † Amphiloma granuliferum, Müll. Arg., var. subvitellinum, Müll. Arg.

Growing with true species.—*Schweinf.*

Parmelia, De Not.**81. Parmelia latissima, Fée, f. isidiosa, Müll. Arg.**

On branches.—*B.C.S.*

On granite rocks above Wadi Kischen (1800-3000 ft.).—*Schweinf.*

82. **Parmelia latissima**, *Fée*, f. **sorediata**, *Nyl.*
On granite rocks above Kischen (2700 ft.).—*Schweinif.*
83. **Parmelia urceolata**, *Müll. Arg.*, var. **nuda**, *Müll. Arg.*
Trunks of trees above Kischen (2400-3000 ft.).—*Schweinif.*
84. **Parmelia Soyauxii**, *Müll. Arg.*
Saxicolous, above Wadi Kischen (1800 ft.).—*Schweinif.*
85. † **Parmelia Schweinfurthii**, *Müll. Arg.*
On smaller branches of fruiting *Rutaceae*, above Kischen (3000 ft.).—*Schweinif.*
86. **Parmelia perforata**, *Ach.*, var. **cetrata**, *Nyl.*
On granite rocks, above Wadi Kischen (3000 ft.).—*Schweinif.*
87. **Parmelia tiliacea**, *Ach.*, var. **rimulosa**, *Müll. Arg.*
Corticolous.—*B.C.S.*
88. **Parmelia conspersa**, *Ach.*, var. **hypoclysta**, *Ach.*
On granite rocks above Kischen (1950 ft.).—*Schweinif.*
89. † **Parmelia convexula**, *Müll. Arg.*
On quartz rocks.—*B.C.S.*
90. * **Parmelia nilgherrensis**, *Nyl.*
Not previously recorded from Sokotra.
On bark of trees, Adho Dimellus (4000 ft.).—*H.O.F.*
91. * **Parmelia perlata**, *Mont.*
Not hitherto recorded from Sokotra.
E. Sokotra [? above Homhil], probably on trees.—*H.O.F.*

Usnea, *Ach.*

92. * **Usnea florida**, *Ach.*
Not previously recorded from Sokotra.
Adho Dimellus, on trees (4000 ft.).—*H.O.F.*
93. * **Usnea articulata**, *Hoffm.*
Not previously recorded from Sokotra.
Adho Dimellus, on trees (4000 ft.).—*H.O.F.*
94. **Usnea straminea**, *Müll. Arg.*
Above Wadi Kischen (2100 ft.), and on Gebel Haghier (3000 ft.).—*B.C.S.*,
Schweinif.

Ramalina, *Ach.*

95. † **Ramalina debilis**, *Müll. Arg.*
Egeling.
96. * **Ramalina dendriscoides**, *Nyl.*, var. **minor**, *Müll. Arg.*
Adho Dimellus, on branches (4000 ft.).—*H.O.F.*
On smaller branches of *Hypericum* above Wadi Kischen (3000 ft.), and
similarly on *Rhois*.—*B.C.S.*, *Schweinif.*

97. † **Ramalina dendriscoides**, *Nyl.*, var. **nodulosa**, *Müll. Arg.*
Saxicolous. — *B.C.S.*
98. * **Ramalina fastigiata** (*Pers.*), *Ach.*
Matagoti, above camp at Homhil (E. Sokotra). On branches.—*H.O.F.*
New to flora of Sokotra.
99. * **Ramalina farinacea** (*Linn.*), *Ach.*
Matagoti, above Homhil camp (E. Sokotra). On branches.—*H.O.F.*
Above Wadi Kischen (1800-1950 ft.).—*B.C.S.*, *Schwein.*
100. **Ramalina dasypoga**, *Tuck.*
Above Wadi Kischen (3000 ft.) — *B.C.S.*, *Schwein.*
101. * **Ramalina Curnowii**, *Crombie.*
Matagoti, above camp at Homhil (E. Sokotra). On rocks.—*H.O.F.*
Not before recorded from Sokotra.

PHYSICIACEI.

Buellia, *De Not.*

102. **Buellia parasema**, *Körb.*
On smaller branches of *Balsumodendron* above Wadi Digal (900 ft.). —
B.C.S., *Schwein.*
103. **Buellia parasema**, *Körb.*, var. **rugulosa**, *Körb.*
On bark of various trees.—*B.C.S.*
104. † **Buellia parasema**, *Körb.*, var. **subæruginascens**, *Müll. Arg.*
On smaller branches of *Balsumodendron* above Wadi Digal.—*Schwein.*
105. † **Buellia parasema**, *Körb.*, var. **contorta**, *Müll. Arg.*
Corticulous.—*B.C.S.*
106. † **Buellia parasema**, *Körb.*, var. **oblongata**, *Müll. Arg.*
On dry and decorticated smaller branches of trees, above Wadi Kischen
(1800 ft.).—*Schwein.*
107. † **Buellia brachyspora**, *Müll. Arg.*
In the thallus of *Buellia innata*, *Müll. Arg.*, on Wadi Kischen (1800 ft.). —
Schwein.
108. **Buellia stellulata**, *Tayl.*, var. **protothallina**, *Müll. Arg.*
On quartz rocks.—*B.C.S.*
109. † **Buellia albinea**, *Müll. Arg.*
On quartz rocks.—*B.C.S.*
110. † **Buellia leucina**, *Müll. Arg.*
On quartz rocks.—*B.C.S.*

111. † *Buellia substigmatea*, Müll. Arg.

On porphyry rocks.—*B.C.S.*

112. † *Buellia substigmatea*, var. *obfuscata*, Müll. Arg.

On porphyry rocks.—*B.C.S.*

113. † *Buellia innata*, Müll. Arg.

Saxicolous, above Wadi Kischen (1800 ft.).—*Schweinf.*

114. *Buellia recepta*, Müll. Arg.

On quartz rocks.—*B.C.S.*

115. *Buellia africana*, Müll. Arg.

On quartz rocks.—*B.C.S.*

Rinodina, Ach.116. *Rinodina teichophila*, var. *corticola*, Arnold.

On branches of shrubs above Wadi Kischen (3000 ft.).—*Schweinf.*

117. † *Rinodina substellulata*, Müll. Arg.

On quartz rocks above Wadi Kischen (1950 ft.).—*Schweinf.*

118. *Rinodina minutula*, Müll. Arg.

Rare.—*B.C.S.*

119. † *Rinodina granularis*, Müll. Arg.

On calcareous rocks.—*B.C.S.*

Physcia, Schreb.120. *Physcia leucomelas*, Michx.

On smaller branches of *Rhois*, above Kischen (3000 ft.).—*Schweinf.*

121. *Physcia speciosa*, Nyl., f. *sorediifera*, Nyl.

On granite rocks above Wadi Kischen.—*Schweinf.*

122. *Physcia crispa*, Nyl.

On granite rocks, on Wadi Kischen (1900 ft.).—*Schweinf.*

123. *Physcia obsessa*, Nyl.

On twigs, above Wadi Kischen (1800 ft.).—*Schweinf.*

124. † *Physcia obscurella*, Müll. Arg.

On quartz rocks, on Wadi Kischen (1950 ft.).—*Schweinf.*

125. † *Physcia obscurella*, var. *fusca*, Müll. Arg.

On quartz rocks.—*Schweinf.*

126. † *Physcia endopyxinea*, Müll. Arg.

On twigs partly with *Pyxine conveza*, Müll. Arg.—*B.C.S.*

127. *Physcia picta*, Nyl.

Corticolous, on *Balsamodendron*, above Wadi Digal (900 ft.).—*B.C.S.*

128. *Physcia picta*, var. *rupicola*, Bagl

On quartz rocks.—*B.C.S.*

129. *Physcia picta*, var. *sorediata*, Müll. Arg.

Above Wadi Kischen (1800 ft.).—*B.C.S.*, *Schwein.*

Pyxine, El. Fries.**130. *Pyxine Meissneri*, Tuck., var. *endoleuca*, Müll. Arg.**

On aloe stems.—*B.C.S.*

131. * *Pyxine coccoes*, Nyl. (Plate xxvii. fig. 3.)

Matagoti, above camp at Homhil, E. Sokotra. On branches.—*H.O.F.*
Not heretofore recorded from Sokotra.

The amphithecium (see fig. 3) in this plant does not apparently keep pace with the growth of the medullary tissue underneath the hypothecium. As a result the parathecium soon outgrows its former thalline covering, and from being lecanorine finally becomes lecideine.

132. † *Pyxine convexa*, Müll. Arg.

On the smaller branches of tufts of *Rocella Montagnei*, Nyl.—*B.C.S.*

THELOSCHISTACEI.***Placodium*, DC.****133. † *Placodium bullatum*, Müll. Arg.**

On quartz rocks.—*B.C.S.*

134. *Placodium lanuginosum*, Müll. Arg.

On stones, under shrubs, slightly covered with earth, near Wadi Kischen (1980 ft.).—*Schwein.*

Theloschistes*, Norm.*135. * *Theloschistes flavicans*, Norm.**

Adho Dimellus (4000 ft.), and in E. Sokotra († at Homhil).—*H.O.F.*
On branches, above Wadi Kischen (3000 ft.).—*B.C.S.*, *Schwein.*

136. *Theloschistes flavicans*, Norm., var. *intermedius*, Müll. Arg.

On branches above Kischen (2400 ft.).—*B.C.S.*, *Schwein.*

STICTACEI.***Sticta*, Schreb.****137. * *Sticta aurata*, Sm.**

On branches, Adho Dimellus (4000 ft.).—*H.O.F.*
On small branches, above Wadi Kischen (3000 ft.).—*Schwein.*

Stictina, Nyl.**138. Stictina Mougeotiana, Nyl.**

On smaller branches, above Wadi Kischen, and on Scheheli Peak, above Hadibu (3750 ft.).—*Schwein.*

COLLEMACEI.

Collema, Ach.**139. Collema multipartitum, Hepp.**

Calcicolous.—*B.C.S.*

140. * Collema flaccidum, Ach.

On branches, Adho Dimellus (4000 ft.).—*H.O.F.*

141. † Collema flaccidum, Ach., var. subnigrescens, Müll. Arg.

On small branches of *Rhois*, above Wadi Kischen (2400-3000 ft.).—*Schwein.*

142. † Collema flaccidum, Ach., var. levis, Müll. Arg.

On small branches of *Rhois*, above Wadi Kischen (2400-3000 ft.).—*Schwein.*

143. † Collema flaccidum, Ach., var. subfurvus, Müll. Arg.

On smaller branches of *Rhois*, above Wadi Kischen (2400-3000 ft.) ; on Mt. Scheheli above Hadibu.—*B.C.S., Schwein.*

The last three varieties Müller Arg. enumerates in his first list as *Synechoblastus flaccidus*, Körb.

Leptogium, Ach.**144. Leptogium diaphanum, Nyl.**

On Scheheli (3750 ft.).—*Schwein.*

145. Leptogium Menziesii, Montg.

On Mt. Scheheli (3750 ft.).—*Schwein.*

OMPHALARIACEI.

Anema, Nyl.**146. † Anema exiguum, Müll. Arg.**

Calcicolous.—*B.C.S.*

Synalissa, Nyl.**147. † Synalissa nitidula, Müll. Arg.**

Calcicolous.—*B.C.S.*

PYRENOCARPI.

VERRUCARIACEI.

Normandina, Nyl.**148. Normandina Jungermannia, Nyl.**

Among lobes of thalli of *Parmelia*, on branches, above Wadi Kischen (3000 ft.).—*Schwein.*

Pyrenula, Ach.

149. †
- Pyrenula obscurata**
- , Müll. Arg.

On bark on branches.—*B.C.S.***Verrucaria, Web.**

150. †
- Verrucaria rupestris**
- , Schrad., var.
- alocizoides**
- , Müll. Arg.

On calcareous rocks.—*B.C.S.*

151. †
- Verrucaria prominens**
- , Müll. Arg.

On quartz rocks.—*B.C.S.***Microglæna, Körb.**

152. †
- Microglæna saxicola**
- , Müll. Arg.

On quartz rocks above Wadi Kischen (1950 ft.).—*Schweinf.***Microthelia, Körb.**

- 153.
- Microthelia micula**
- , Körb.

Corticulous. On small branches.—*B.C.S.***Anthracotheceium, Mass.**

- 154.
- Anthracotheceium libricolum**
- , Müll. Arg.

On branches.—*Schweinf.***Polyblastia, Th. Fries.**

155. †
- Polyblastia tropica**
- , Müll. Arg.

Corticulous.—*B.C.S.***Bathelium, Ach.**

156. †
- Bathelium pauperrimum**
- , Müll. Arg.

On small branches, above Wadi Kischen (2100 ft.).—*B.C.S., Schweinf.*

157. †
- Bathelium velatum**
- , Müll. Arg.

Corticulous, on the larger branches.—*B.C.S.***PHYCOMYCETES.*****Sporidesmium, Link.**

- 1.
- Sporidesmium maculans**
- , Beitr. & Curt.

On naked wood.—*B.C.S.***BASIDIOMYCETES.****GASTEROMYCETES.****Batarrea, Pers.**

- 1.
- Batarrea Stevenii**
- , Fries.

Near Galonsir.—*B.C.S.** The remainder of this list is taken from Balfour's *Botany of Socotra*.

Podaxon, Fries.**2. Podaxon pistillare, Fries.**Galonsir Plain.—*B.C.S.***HYMENOMYCETES.****AGARICINI.****Agaricus, Tournef.****3. Agaricus (Pleurotus) applicatus, Batsch.**On bark.—*B.C.S.***Lentinus, Fries.****4. Lentinus cochleatus, Fries.**On trunks near Hadibu.—*B.C.S.***POLYPOREI.****Polyporus, Micheli.****5. Polyporus igniarius, Fries.**Near Galonsir.—*B.C.S.***Trametes, Fries.****6. † Trametes socotrana, Oke.**Logs on slopes of Haghier south from Hadibu.—*B.C.S.***7. Trametes rigida, Berk. & Mont., var. glabra, Oke.**Wood near Galonsir.—*B.C.S.***HYDNEI.****Kneiffia, Fries.****8. Kneiffia setigera, Fries.**On bare wood.—*B.C.S.***AURICULARINI.****Stereum, Pers.****9. Stereum versiforme, B. & Curt.**Rotten logs near Galonsir.—*B.C.S.***10. Stereum retirugum, Oke.**On wood near Galonsir.—*B.C.S.***Corticium, Pers.****11. Corticium arachnoideum, B. & Br.**Rotten wood, Galonsir Plain.—*B.C.S.*

TREMELLINEÆ.

Hirneola, Fries.

12. **Hirneola polytricha, Montg.**

Logs and stumps.—*B.C.S.*

Dacrymyces, Nees.

13. **Dacrymyces stellatus, Nees.**

Rotten wood, Galonsir Plain.—*B.C.S.*

UREDINEÆ.

Uromyces, Link.

14. **Uromyces Commelinæ, Cke.**

Leaves of species of *Commelina*.—*B.C.S.*

ALGÆ.

CHARACEÆ.

Chara, Linn.

1. † * **Chara socotrensis, Nordst.**

In rivers in Garieh Plain.—*H.O.F.*

Near Hadibu. Near Katheng.—*B.C.S., Schweinf.*

2. **Chara gymnopitys, A. Br.**

B.C.S.

3. **Chara gymnopus, A. Br., var. angolensis, A. Br.**

B.C.S.

RHODOPHYCEÆ.

CERAMIACEÆ.

Ceramium, Adans.

4. **Ceramium tenuissimum, Lyngb.**

B.C.S.

5. **Ceramium subtile, J. G. Ag.**

B.C.S.

LAURENCIACEÆ.

Champia, Desv.

6. **Champia compressa, Harv.**

B.C.S.

GELIDIACEÆ.

Hypnea, Lamourx.

7. **Hypnea hamulosa, Montg.**

B.C.S.

CORALLINEÆ.

Jania, *Lamourx.*8. **Jania rubens**, *Lamourx.**B.C.S.*

PHÆOPHYCEÆ.

FUCACEÆ.

Sargassum, *Ag.*9. **Sargassum crispum**, *Ag.**B.C.S.*10. **Sargassum asperifolium**, *Her. et. Mart.**B.C.S.*

DICTYOTEÆ.

Padina, *Adans.*11. **Padina pavonia**, *Adans.**B.C.S.***Dictyota**, *Lamourx.*12. **Dictyota dichotoma**, *Lamourx.**B.C.S.*13. **Dictyota dichotoma**, *Lamourx.* var. **intricata**, *Grav.**B.C.S.*14. **Dictyota acuminata**, *Kütz.**B.C.S.***Asperococcus**, *Lamourx.*15. **Asperococcus sinuosus**, *Bory.**B.C.S.*16. **Asperococcus intricatus**, *J. G. Ag.**B.C.S.***Hydroclathrus**, *Bory.*17. **Hydroclathrus cancellatus**, *Bory.**B.C.S.*

CHLOROPHYCEÆ.

ZYGNEACEÆ.

Spirogyra, *Link.*18. **Spirogyra turpis**, *Kütz.**B.C.S.*

19. *Spirogyra condensata*, Ktz.

B.C.S.

20. *Spirogyra decimina*, Link.

B.C.S.

21. *Spirogyra dubia*, Ktz., var. *longiarticulata*, Ktz.

B.C.S.

Zygnema, Ag

22. *Zygnema Vaucherii*, Ag., var. *tenue*, Rabenh.

B.C.S.

CONFERVOIDEÆ.

Chætomorpha, Ktz.

23. *Chætomorpha tortuosa*, Ktz.

B.C.S.

24. *Chætomorpha chlorotica*, Ktz.

B.C.S.

ULVACEÆ.

Ulva, Linn.

25. *Ulva latissima*, Linn.

CHÆTOPHORACEÆ.

Microthamnion, Nag.

26. † *Microthamnion breviarticulatum*, G. Dickie.

SCHIZOPHYCEÆ.

NOSTOCACEÆ.

Nostoc, Vauch.

27. *Nostoc aureum*, Ktz.

B.C.S.

28. *Nostoc verrucosum*, Vauch.

B.C.S.

RIVULARIEÆ.

Schizosiphon, Ktz.

29. *Schizosiphon aponinus*, Menegh.

B.C.S.

OSCILLARIEÆ.

Lyngbya, Ag.

- 30.
- Lyngbya obscura*
- , Ktz.

B.C.S.

- 31.
- Lyngbya curvata*
- ,
- Rebenh.*

B.C.S.

- 32.
- Lyngbya majuscula*
- ,
- Harr.*

B.C.S.

33. †
- Lyngbya scabrosa*
- ,
- G. Dickie.*

B.C.S.

Oscillaria, Bory.

- 34.
- Oscillaria Frölichii*
- , Ktz.

B.C.S.

- 35.
- Oscillaria anguina*
- ,
- Bory.*

B.C.S.

SCHIZOMYCETES.

Hypheothrix, Ktz.

- 36.
- Hypheothrix vulpina*
- , Ktz.

B.C.S.

Beggiatoa, Trev.

- 37.
- Beggiatoa alba*
- ,
- Trev.*

B.C.S.

DIATOMACEÆ.

RAPHIDIEÆ.

CYMBELLÆ.

Amphora, Ehr.

- 1.
- Amphora ovalis*
- ,
- Ehr.*

B.C.S.

Cymbella, Agh.

- 2.
- Cymbella lanceolatum*
- ,
- Ehr.*

B.C.S.

- 3.
- Cymbella bengalensis*
- ,
- Grunow.*

B.C.S.

- 4.
- Cymbella cistula*
- ,
- Ehr.*

B.C.S.

- 5.
- Cymbella cymbiformis*
- ,
- Ehr.*

B.C.S.

NAVICULEÆ.

Navicula, *Bory*.

- 6.
- Navicula sphærophora*
- ,
- Kütz.*

B.C.S.

- 7.
- Navicula elliptica*
- ,
- Kütz.*

B.C.S.

- 8.
- Navicula mutica*
- ,
- Kütz.*
- , var.
- Cohnii*
- ,
- Hilse*
- .

*B.C.S.**Mastogloia*, *Thwaites*.

- 9.
- Mastogloia Dansei*
- ,
- Thwaites*
- .

B.C.S.

- 10.
- Mastogloia lanceolata*
- ,
- Thwaites*
- .

B.C.S.

- 11.
- Mastogloia elliptica*
- ,
- Agh.*

*B.C.S.**Stauroneis*, *Ehr.*

- 12.
- Stauroneis anceps*
- ,
- Ehr.*
- , var.
- amphicephala*
- ,
- Van Heurck*
- .

B.C.S.

GOMPHONEMEÆ.

Gomphonema, *Agh.*

- 13.
- Gomphonema intricatum*
- ,
- Kütz.*

B.C.S.

- 14.
- Gomphonema affine*
- ,
- Kütz.*

B.C.S.

- 15.
- Gomphonema acuminatum*
- ,
- Ehr.*
- , var.
- coronatum*
- ,
- Van Heurck*
- .

B.C.S.

- 16.
- Gomphonema Turris*
- ,
- Ehr.*

B.C.S.

- 17.
- Gomphonema constrictum*
- ,
- Ehr.*
- , var.
- subcapitata*
- ,
- Van Heurck*
- .

B.C.S.

ACHNANTHÆ.

Achnanthes, *Bory*.

- 18.
- Achnanthes linearis*
- (
- Wm. Smith*
-).

B.C.S.

COCconeIDEÆ.

Cocconeis, *Ehr.*

- 19.
- Cocconeis pediculus**
- ,
- Ehr.*

B.C.S.

PSEUDORAPHIDEÆ.

FRAGILARIÆ.

Epithemia, *De Brebisson.*

- 20.
- Epithemia gibberula**
- ,
- Ehr.*
- , var.
- producta**
- ,
- Van Heurck.*

*B.C.S.***Eunotia**, *Ehr.*

- 21.
- Eunotia pectinalis**
- ,
- Ehr.*

*B.C.S.***Fragilaria**, *Lyngbye.*

- 22.
- Fragilaria Ungeriana**
- ,
- Grunow.*

B.C.S.

CRYPTORAPHIDEÆ.

BIDDULPHIÆ.

Terpsinoë, *Ehr.*

- 23.
- Terpsinoë musica**
- ,
- Ehr.*

*B.C.S.***Cerataulus**, *Ehr.*

- 24.
- Cerataulus socotrensis**
- ,
- Kitton.*

B.C.S.

COSCINODISCEÆ.

Cyclotella, *Kütz.*

- 25.
- Cyclotella Meneghiniana**
- ,
- Kütz.*
- , var.
- rectangulata**
- ,
- Brébisson.*

B.C.S.

II.—The Lichens and Sea=Weeds of Abd-el-Kuri.

LICHENES.*

DISCOCARPI.

GRAPHIDACEI.

Roccella, *Ach.*

1. *Roccella Balfourii*, *Müll. Arg.*

On rocks on Gebel Saleh.—*H.O.F.*

2. *Roccella fuciformis* (*L.*), *Ach.*

On rocks on Gebel Saleh.—*H.O.F.*

Some small fragments bearing young *soralia*.

ALGÆ.

The only Sea-Weeds collected were a few I obtained at low tide on the rocks near our anchorage in Bander Saleh, which were preserved in formal. They were sent to Mr. E. M. Holmes, F.L.S., who kindly examined them, and sends me the list below with the following note:—"I have carefully examined your bottle of *Algae*, and, as far as it is possible to identify them from the fragmentary, unfruited, and decolorized material, I find the following species."—*H.O.F.*

RHODOPHYCEÆ.

GELIDIACEÆ.

Gelidium, *Lamourx.*

1. *Gelidium rigidum*, *J. G. Ag.*

SPHÆROCEACEÆ.

Gracilaria, *Grev.*

2. *Gracilaria corticata*, *J. Ag.*

3. *Gracilaria Müllardetii*, *J. Ag.*

The structure of these two plants is that of *Gracilaria*; but neither are in fructification. I have not hitherto seen *Gracilaria Müllardetii* from anywhere north of the Mascarene Islands. It is plentiful at Mauritius.

Jania, *Lamourx.*

4. *Jania rubens*, *Lamourx.*

* By Dr. O. V. Darbishire.

RHODYMENIACEÆ.

Desmia, *J. Ag.*

5. *Desmia ambigua*, *Harr.*

RHODOMELACEÆ.

Laurencia, *Lamourx.*

6. *Laurencia papillosa*, *Grer.*

PHÆOPHYCEÆ.

FUCACEÆ.

Sargassum, *Ag.*

7. *Sargassum flavicans*, *J. Ag.*
8. *Sargassum cargophyllum*, *J. Ag.*
9. *Sargassum virgatum*, *J. Ag.*

Turbinaria, *Lamourx.*

10. *Turbinaria ornata*, *J. Ag.*

CHLOROPHYCEÆ.

CAULERPACEÆ.

Caulerpa, *Lamourx.*

11. *Caulerpa selago*, *C. Ag.*

This identification is doubtful as only two fragments of *Caulerpa* were found, which are rather more slender than usual in this species. There is, however, no other species that the fragments resemble more closely.

CODIACEÆ.

Chlorodesmis, *Harv.*

12. *Chlorodesmis carnosa*, *Harv.*

Codium, *Ag.*

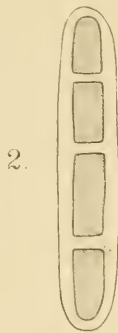
13. *Codium tomentosum*, *Stuckh.*

PLATE XXVII.

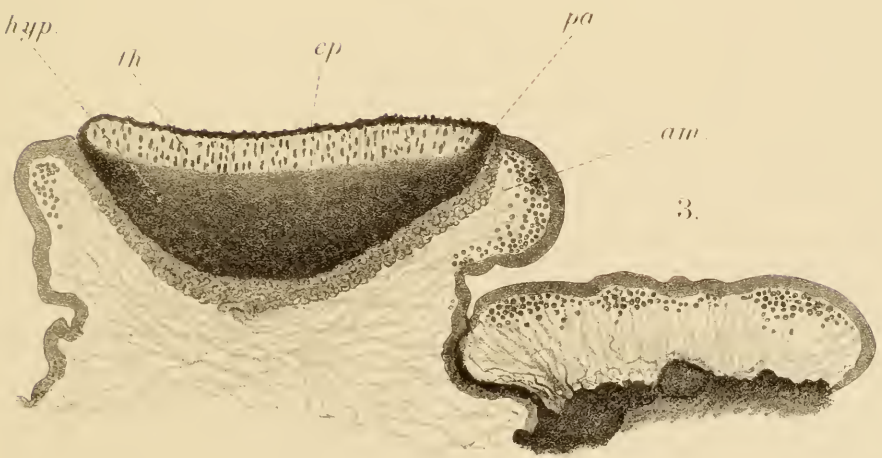
- Fig. 1. ROCCELLA BALFOURII, *J. Müll. Arg.* *Vertical section*
of Apothecium. $\times 55$, p. 550.
- Fig. 2. ROCCELLA BALFOURII, *J. Müll. Arg.* *A single*
six-celled spore. $\times 1075$, p. 550.
- Fig. 3. PYXINE COCCOES, *Ngl.* *Vertical section of Apothecium,*
p. 557.



1.



2.



3.

Geology
of
Sokotra
and
Abd-el-Kuri

Geology.

Note on the Geology of Sokotra and Abd-el-Kuri.

By Prof. J. W. GREGORY, D.Sc., F.R.S.

[*Extracted from the* GEOLOGICAL MAGAZINE,
Decade IV., Vol. VI., No. 426, p. 529, Dec., 1899.]

Geology.

The first account of the geology of Sokotra we owe to Lieutenant J. R. Wellsted,* who compiled the Admiralty chart and map, and in 1835 described the island in a detailed memoir, in which he showed that it consists of a mass of granite capped by limestones. Nothing material was added to this description until 1883, when Professor Bonney published his account † of the extensive rock collection made by Professor I. B. Balfour during a six weeks' visit to the island in February and March, 1879. Professor Bonney's study of the rock specimens enables him to prove that Sokotra consists of a block of Archean rocks covered in places by massive limestones, which, on the evidence of their foraminifera, Professor T. R. Jones suggested were probably of Miocene age. It was further shown that both the Archean series and the Cainozoic limestones are cut through by dykes of trachyte and basalt, associated with a series of rhyolitic lavas. Professor Balfour's expedition not only proved that the foundations of Sokotra are built of old materials, but that the island is of considerable antiquity, as is indicated by its rich endemic flora. ‡

In 1880 Sokotra was visited by Emil Riebeck, who collected some rock specimens containing the mineral which was described in 1888 by Sauer under the name of Riebeckite. § Further details regarding the Archean and volcanic rocks were given in the same year in a paper by Miss Raisin. ||

During the winter of 1898-9 Sokotra and the neighbouring island of Abd-el-Kuri were visited by Dr. H. O. Forbes and Mr. Ogilvie Grant, who made a

*J. R. Wellsted, "Memoir on the Island of Socotra": Journ. Roy. Geogr. Soc., vol. v. (1835), pp. 129-229, and map.

†T. G. Bonney, "On a Collection of Rock Specimens from the Island of Socotra": Phil. Trans., vol. 174 (1883), pp. 273-294, pls. vi. and vii. Some preliminary remarks on the geology of the island were included in Professor Balfour's report, "On the Island of Socotra": Rep. Brit. Assoc., 1881, p. 486.

‡According to Balfour ("Botany of Socotra": Trans. Roy. Soc. Edinb., vol. xxxi., 1888, p. lxxv.), the island has been a land area since the Permian-Carboniferous, and "an island certainly from Tertiary times."

§Sauer, "Ueber Riebeckit, ein neues Glied der Hornblendegruppe": Zeit. deut. geol. Ges., vol. xl. (1888), pp. 138-146.

||C. A. Raisin, "Rock Specimens from Socotra": Geol. Mag., Dec. III., vol. v. (1888), pp. 504-507.

collection of rocks, upon which I have been asked to report. Dr. Forbes has given me an account of the mode of occurrence and distribution of the principal rocks. At about the same time both islands were visited by the Austrian South Arabian Expedition in the *Gottfried* and a note on their geology has been published by Dr. F. Kossmat, in which he remarks the occurrence of Cenomanian and Eocene limestones.*

The present collection does not necessitate any modification in the geological history of Sokotra, as deciphered by Professor Bonney from the materials available in 1883. But the collection adds to the knowledge of the distribution of the different rocks in the island.

[Professor Bonney's conclusions on the geology of the island, based on his examination of the rock specimens brought home by Professor Balfour, are:—† “It would appear that in Sokotra we have, as the foundation-stones and ‘core’ of the island, if the phrase be permissible for the convenience of the reader, a mass of rock of very great antiquity. There is clear evidence of the presence of gneissic rocks which, in their lithological characters, resemble closely those which exist in the north-west of Scotland, the Malvern Hills, and one or two other localities in our own island, in Northern America, and in many other parts of the globe. By whatever name these may be called, and however they may be co-related one with another, it is evident that their antiquity is enormously great, and that they had attained their present mineral condition before the earliest palæozoic rocks were deposited. Associated with these are granites, which, though of later date, are, probably, also of great antiquity. In the Sinai peninsula, we have also gneiss, schists, and various granitic rocks. Of the latter, I possess a small collection, given to me by Professor E. H. Palmer,‡ and the resemblance of some of the specimens to those of Sokotra is very remarkable. In the geological notes added by the Rev. F. W. Holland to the Report of the Ordnance Survey (ch. viii.), we find it stated, indeed, that the prevailing rock, in the Sinai region, is syenite (by which term, probably, hornblende granite is meant), so that out of several hundred specimens he only possessed two or three of true granite. This may be, but my specimens from the summits of Serbal, of Jebel Musa, and Um Shomer closely resemble some of the Sokotra rocks, especially the first and second, which are coarse reddish granites, composed almost wholly of quartz and felspar (pegmatites). From the summit of Serbal also comes a finer-grained granite, and I have an ordinary granite from Wady Sigillia. Other specimens, exactly as in the Sokotra collection, might be either true igneous or highly metamorphic rock. In the Sinai region the old gneiss appears only to have been recognised in the northern part, where it forms an irregular trough to the north of Jebel Serbal, the higher peaks (like the Haggier range in Sokotra) being granite. I miss, however, from the Sokotra district, or find but feebly represented—for there is one

* F. Kossmat: Sitz. math. nat. Cl. k. Akad. Wiss. Wien, 1899, No. ix., pp. 73-82.

† This quotation from Professor Bonney's report in the *Philosophical Transactions* (loc. cit.) is inserted here by the editor.

‡ He was a member of the Sinai Survey Expedition in 1868-9.

specimen which may belong to it—the friable variably-coloured sandstones which form so marked a feature in some parts of the Sinaitic peninsula (*e.g.*, Wady Mokatteb).*

“These, after having been assigned to more than one geological epoch, were referred by Mr. Holland, on the evidence of fossils, to the carboniferous. In Sinai, as in Sokotra, we have huge masses of limestone, which in like way form great plateaux—as, for example, the Tih—and were deposited in an ocean, in which the well-known peaks of Sinai probably formed rocky islands, but deposition there commenced at an earlier period than we can venture with the evidence at present before us to claim for Sokotra, for the limestones of Sinai are assigned to part of the cretaceous and to the eocene age; the Nummulitic limestone, for example, being finely developed as in Wady Dhaghadeh. Coraliferous beds of miocene age are, however, found in that region.† The rocks of Sinai are cut by dykes of ‘basalt, greenstone, and porphyrite,’ the first of which, as in Sokotra, are probably comparatively modern, but we do not find there, so far as I can learn, representatives of the great group of the quartz-felsites and rhyolites which seem so enormously developed in Sokotra, and were certainly connected with active volcanoes. The geological age of these cannot be determined. They are undoubtedly older than the limestone group; so that, if no part of this is earlier than the middle tertiary, they might belong to any geological period between that and the latest Precambrian, to the volcanic rocks of which they have, indeed, considerable resemblance. I am not aware that the ‘argillite’ of Sokotra—of which I can only say that it is older than the limestone—is represented in Sinai. As here, so also in Sokotra, there are basalts of comparatively late geologic age—post miocene—and in the latter some compact trachytic rocks, which, however, differ from the older rhyolites, and are generally paler in colour.

“We have, then, in Sokotra, as it seems to me, evidence of rocks of an immense, and a land surface of a very great, antiquity. Excepting this argillite of uncertain age and limited extent, and perhaps some sandstone (also local), there is no evidence in the specimens before me to show that this island was submerged during any part of the palæozoic or mesozoic period.‡ During the Kainozoic it undoubtedly shared in the downward movement which affected so large a portion of the globe in and about the North African

* This absence of the sandstones is probably an accident (the rock being very friable), for Professor Balfour mentions “purple sandstones” (see p. 275).

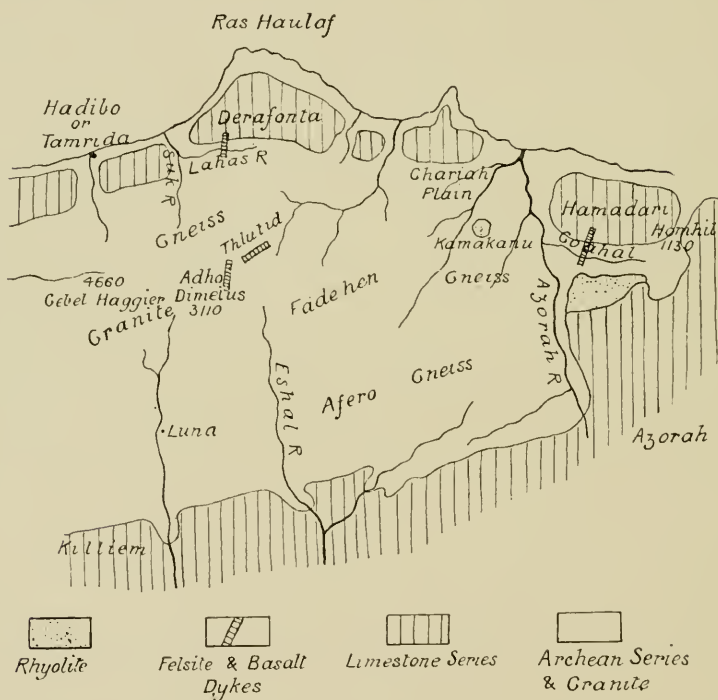
† Bauerman, Quart. Jour. Geol. Soc., vol. xxv., p. 37.

‡ “Africa south of the Sahara was probably a stable area during many of the alterations of the relative levels of land and sea of the north and of Europe.”—Professor P. M. Duncan, Presidential Address to Geol. Soc., 1877, Journal, vol. xxxiii., p. 86 (Proceedings). West of the Sinai Peninsula old schists and granite crop out in Egypt, and east of it on the opposite side of the Gulf of Akabah, flanked in both cases by “Nubian sandstone.” See the map attached to the Presidential Address to the Geologists’ Association (delivered November 3, 1882), by Mr. W. H. Hudleston (Proceedings, vol. viii., p. 1), in which is given an admirable summary of the Geology of Palestine and the neighbouring districts.

and mid-Asiatic districts; but I should infer that the invasion of the sea commenced much earlier in the Sinaitic peninsula, and think it possible that the topmost peaks of the Haggier Mountains were at no time wholly submerged. As it again rose from the waves—perhaps being for a while connected with the African continent—the meteoric forces resumed their work of sculpture and the waves began their work of insulation. Since then the fauna and flora have undergone their own modifications, but in the Haggier Hills we have probably a fragment of a continental area of great antiquity, and of a land surface which may have been an “ark of refuge” to a terrestrial fauna and flora from one of the very earliest periods of this world’s history.”]

1.—Geology of Sokotra.

The rock collection from Sokotra contains representatives of three groups of rocks—a basal Archean series, some massive limestones, and some comparatively recent volcanic rocks.



The largest part of the collection consists of Archean rocks and some associated granites. As a rule, the gneiss is more granitoid than the rock which forms the main mass of the East African Archean plateau; but a specimen from Thlutid [Jena-agahan], at the height of 900 feet, corresponds

with the typical gneiss of the mainland. With the granitoid gneiss there is a coarse pink granite which forms the summit of the Haghier, Gebel Dryat, the highest peak in Sokotra; it occurs also at Adho Dimellus, and at the height of 1500 feet at Fadehen.

The second group of the Archean series consists of dark-green amphibolite schists, of the type that forms such a conspicuous feature in the East African gneiss series. This rock was collected by Dr. Forbes in the Hadibu Plain near Tamarida.

The Archean rocks of Sokotra therefore resemble those of the East African Nyika series, and the island is simply an outlier of the East African plateau.

Overlying the gneisses is a compact, massive limestone which has been sometimes rendered coarsely crystalline, probably by contact metamorphism. This limestone forms the extensive plateau at the eastern end of the island, and, according to Dr. Forbes, sections cut by the Goahal river show that the limestone there rests directly on the Archean series. South of the Goahal river the limestone forms a plateau, the southern end of which is continued westward round the southern flanks of the central highlands. From the Hamadari [*read* Hamaderu.—*H.O.F.*] plateau a belt of limestone extends westward to beyond Tamarida; the rivers have cut through it, showing that it rests on the Archean series.

The collection gives no evidence as to the age of the limestones, but fortunately Herr Kossmat has obtained from it a number of mollusca and echinids, which enabled him to determine it as Eocene. Kossmat also records an underlying Cenomanian sandstone with *Janira quinquecostata*.

The last group of rocks represented in the collection is a series of recent volcanic rocks, of types already described from Sokotra by Professor Bonney and Miss Raisin.

The volcanic rocks include rhyolites, quartz-felsites, and basalt. Most of the specimens are dyke rocks, but one lava is included in the collection. It is a rhyolite with well-marked fluxion structure, and containing many angular fragments; it was collected on the edge of the plateau, south of the Goahal river. A similar rock has been described and figured by Professor Bonney* from Azorah, and, according to Dr. Forbes, the rounded hill in the Garieh Plain near Kamahanu consists of the same rhyolite.††

Quartz-felsites were collected from dykes intrusive in the Archean series at Homhil and Adho Dimellus. The felsites at both localities are intensely altered by decomposition; the abundant iron-ores have been altered to leucoxene, and the matrix is stained bright red. The only unaltered minerals are the large phenocrysts of quartz; and they are deeply corroded, as illustrated by Velain, ‡ from the quartz-trachytes of Aden, and by Miss Raisin, § in a quartz-felsite from Sokotra. In one case the quartz shows a zonal

* Bonney : op. cit., p. 287, pl. vii. fig. 5.

† Ch. Velain : "Descript. géol. presqu'île d' Aden," 1878, p. 18, fig. 2.

‡ Raisin : op. cit., p. 505, fig. 1.

†† Prof. Gregory must have misunderstood me here, for Kamahanu hill is entirely of granite.—*H.O.F.*

arrangement of the inclusions, a feature unusual in volcanic quartz crystals; but the identification of the mineral was confirmed by the use of convergent polarised light. The felsite from Adho Dimellus has numerous, somewhat ill-defined spherulites; in that from Hombil some of the smaller patches of secondary quartz are traversed by faint lines like cleavages, suggesting that the quartz has been formed by the alteration of tridymite aggregates.

The last member of the rhyolite-felsite series is an altered, fine-grained trachyte from the Garieh Plain. It is similar in character to the trachyte figured by Professor Bonney* from the Azorah district.

A dyke of a fairly fresh basalt was found by Dr. Forbes at Thlutid (Jena-agahan) on the north-east † slope of the granite mass of the Haghier ‡

The most interesting feature in the trachyte and felsite is that the rocks resemble those of the Aden volcanic series rather than those of the East African volcanic group. For opportunities of examining some of the Aden rocks I am indebted to Mr. G. T. Prior.

Hence Sokotra appears to be an outlier of the Somali plateau, which has been involved in the movements which formed the Gulf of Aden, and has been the scene of the eruption of volcanic rocks of the Aden series.

* Bonney: *op. cit.*, p. 287, pl. vii. fig. 6.

† Professor Gregory had in his original paper inadvertently written "north-west" for "north-east"; and the "granite mass of Adho Dimellus" for "of the Haghier." Adho Dimellus lies to the west of Thlutid (Jena-agahan), and quite in the heart of the Haghier *massif*. I have, therefore, ventured to correct the passage.—*H.O.F.*

II.—Geology of Abd-el-Kuri.

West of Sokotra is the small island of Abd-el-Kuri, where a larger rock collection was made by Messrs. Forbes and Grant. It was also visited by Dr. Kossmat, who has described it as composed of amphibolites, penetrated by a network of granites and camptonite dykes, and capped by a limestone which he suggests to be of Turonian age. The only previous geological account of the island known to me is by H. J. Carter,[†] who in his memoir on the geology of the south-east coast of Arabia described Abd-el-Kuri as composed of a mass of granite and diorite, capped by a limestone which reaches to the summit at the level of 1600 feet above the sea.

The collection from Abd-el-Kuri is composed mainly of rocks belonging to the Archean series. They include a series of amphibolite schists, a syenitic gneiss, some specimens of which have a considerable development of epidote, and a white gneiss with hornblende aggregations: the last rock is strikingly like one which is common in the Ulu Mountains of Ukambani in British East Africa. This series of foliated rocks is cut through by pegmatite dykes, which are almost as coarse in grain as those of Somaliland: in one specimen collected the muscovite occurs in crystals from two to three inches in diameter.

The Archean rocks are covered by limestones which occur at different levels from 40 feet above the sea to the summits of Gebel Saleh and Gebel Somali, the highest peaks in the island. The limestones appear to be very fossiliferous, and one specimen is crowded with shell fragments; but the only specimen generically determinable is a *Nerinea* in a block of limestone collected by Dr. Forbes at the height of 700 feet. The limestone at that point is, therefore, no doubt Cretaceous.

On the lower parts of the island a reef limestone occurs up to a height of 40 feet above sea-level. As it contains well-preserved specimens of *Goniastrea retiformis*, it is no doubt of Pleistocene age.

[†] "Geol. Papers on Western India," 1857, p. 620. On p. 621 of the same work Carter describes "The Brothers," the islets between Sokotra and Abd-el-Kuri, as also formed of granite and diorite capped by limestone.

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